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FIFTEENTH YEAR.

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CLEVELAND HARDWARE TRADE

The hardware trade of Cleveland the present year has passed through varied and excited phases. The spring opened with a good demand and trade for several months was continually heavy. Then came a slackening of business, accompanied by a falling market. Although the aggregate trade has not come up to the expectations that had been entertained, it must be considered as on the whole satisfactory. The fact that customers do not care to overstock themselves does not imply a lessening of business; if separate orders are more moderate, there are also more of them. It is only under expectation of a rise that there can be a heavy pressure, or the inability of manufacturers to meet demand. The first phase has been illustrated in nails which here rose to $4 per keg with the great western strike; the second has been shown in the inability of dealers to supply mechanics' tools in sufficient quantities. At present the full resumption of work by the nail factories affords a certainty that present rates will tumble; there is also the effect of enlarged facilities of production to be taken into account. Trade in nails during the year so far has been exceedingly large. The same may be said of builders' hardware generally, owing to the numerous structures here and elsewhere in Northern Ohio that have been going up. At no time, as at the present, were hardware decorative articles more extensively used in household furnishing, as we showed in a late article on "Art in Hardware." The present shrinkage in the value of iron, the misgiving whether it can be maintained at current rates, has had an appreciable though slight effect on hardware articles. Many of the manufacturing firms and associations have during the past few months reduced the figures of price lists or increased discounts, the latest instance being that of the wire cloth manufacturers. Nearly all heavy goods sympathise with iron. The best American tool steel is now 12½@13 cents per pound Present values may be said to be fairly maintained. Our dealers in sadlery hardware report an active country demand for goods, and a marked change for the better in the city trade, especially in harness goods. Winter saddlery and harness goods will go all the brisker for the reason that country retailers have not stocked heavily up. The business is steadily increasing in cabinet hardware, and prices are quite firm. The demand for hardware in general appears this year to have been void of the slightest element of speculation, and the trade was never on a more healthy basis. The demand for foreign hardware is large when the season is considered, and goods suited to the requirements of the holiday trade are moving freely.

WASTE OF POWER IN FRICTION.

The frequent use of the indicator for determining the amount of power consumed in driving shafting is of great value. From 30 to 50 per cent. of the power of engines is ordinarily used for this purpose. The running condition of shafts and bearings, the alignment, the quality of the lubricant, and the tension of the belting, all have an important effect on the amount of power used up in friction. These are every one liable to change. The difference in the friction of a line of shafting in perfect order, and the same not in perfect order, may not be such as to attract attention by any outward sign. But the indicator will show a difference, and it is liable to be of considerable amount. The repeated employment of the indicator for this purpose is a simple and certain means for showing changes that may occur, and furnishes a reliable indication as to when this important consumer of power needs attention. The friction of the shafting and loose pulleys located in a certain new building was found by indicator test to consume 19.34 horse power. At the expiration of fifteen months a similar test of the same shafting showed a consumption of 26.64 horse power, being an increase of 38 per cent. As far as those having charge were aware, the bearings and all the conditions were practically the same as before. A test on another engine showed an increase in friction amounting to 44 per cent. after the expiration of five months. The use of the indicator, the determination of the actual performance by tests of boilers and engine, the careful examination of the uses to which steam is applied, not only detect the first source of waste, but locate the place of the second, and point to remedies for both.

AMERICAN AND ENGLISH AXES.

The superiority of American and English axes is shown best by the preference accorded to them in the Australian market, where they come more directly into competition. In addition to the quality of the tool steel, the forms in which American axes are fashioned, are in their favor, forms of blades and handles. These, of course, admit of imitation, not so in quality, and our best makers compete in distant markets even on the score of price. The Australian correspondent of the London *Ironmonger* writes: "It is satisfactory to notice "that an English house is making an effort to com-"pete with the Yankees in axes and similar articles. "But the Anglo-American axes are invoiced at 54s "per dozen, while the best American (the "Hart-"ford") are put on board at 48s. 9d. for the same "average weights. Furthermore, the casing on "English axes costs 4s to 5s per dozen; on the "Ameriean, nothing. It is, therefore, plain that the "trade must go to America, unless a very large re-"duction in the price of the English goods can be "made. Collins's "Hartford" axes have a splendid "reputation all over Australia, and it would be "most onerous to oust them from the market. It is "perfectly useless to try unless the competing "article is at least as good in all points of view, "and lower in price as well. There is no patriotism "in commerce. The Anglo-American axes are well "shaped, and are apparently of first-rate material, "but the price of them is absurd, taking into con-"sideration the difference in cost of labor and of "steel in the two countries." This testimony, looking to the source, is extraordinary for its outspoken character. A large English manufacturing firm, in reply to these statements, affirm that they are prepared to supply goods equal in quality, though not in finish, at the same price. This, so far, is mere assertion, but finish is an important element in an axe as in numerous other tools, and modifying an old adage, we may remark that an axe worth making is worth a good finish. The *Ironmonger* says: "Such a discrepancy must, "however, tend to the advantage of the American "makers, and so long as it exists they will neces-"sarily command the Australian markets. For "ourselves we do not see any valid reasons why our "axe manufacturers should not be able to meet the "United States makers on even terms. We have "better and cheaper steel, accumulated experience, "cheaper labor, and equal mechanical appliances." The special attention given to tool steel here has resulted in the production of qualities fully equaling, if not excelling, anything which the steel manufacturers of England can produce. Then as to the manufacture of axes, English makers have not equal mechanical appliances to our own. The assertion that English axes are inferior to American is conceded by the non-acceptance by English makers a of challenge given out in 1872 before the Committee of Ways and Means at Washington by an American axe maker who used American steel, challenging the English or American makers who used English steel to a test of a dozen axes on terms that the free-trade members of the committe said were fair has never been accepted.

THE QUESTION OF FREE CANALS.

The Middle and the Western States would be very well pleased to have the New York canals made free. Shippers, where time is not a supreme object, will consign by the water route, if this proves the cheapest; besides which it is not in them to object to any amount of competition. For one reason and another the New York Legislature has by moderate majorities declined to make the State canals free, but the merchants of New York, who are naturally eager to facilitate the transport of freight to their city from all interior ports, have secured an appeal to the people on the subject on a proposed amendment to the Constitution providing for the abolition of canal tolls. Of course it is flour and grain that is chiefly looked to. There is an existing fear that if greater canal facilities are not afforded, Philadelphia, Baltimore, and even Boston will proportionately benefit. A sleepy Rip Van Winkle spirit would seem to have governed the management of the New York canals, if it be really true, as affirmed by the New York Board of Trade, that with an improvement in the lock system, by substituting vertical and outward opening gates, the capacity of the canals for transportation would be increased 70,000,000 tons for the season, and that the time of transportation could be reduced at least one-third, and that boats of greater capacity could be used, which, with the use of steam towing on the canals, could transport profitably at rates so low as to cope more effectually with railroad competition.

TIN PLATE MANUFACTURE.

THE total consumption of tin plate during the year 1881 amounted to nearly 180,000 tons. A fully equipped rolling mill with two trains of sheet rolls can produce about 2,500 tons per annum, and about 170 persons, consisting of puddlers, knobblers, rollers, heaters, tinners, etc., will find employment in each such mill. The tin-plate manufacture, therefore, occupies seventy rolling mills, with 11,900 men. To make a ton of tin plate there is needed 1.3 tons of pig metal, or 234,000 tons to supply the demand of tin plate manufacturers. To produce this amount of pig metal 16 ordinary blast furnaces must run constantly. Each of them will give employment to 75 employes, or in all, 1,200 men. The coal necessary to turn a ton of pig metal into a ton of tin plate is about 100 bushels, or four tons per ton of finished plate; total, 720,000 tons of coal. The coke necessary to reduce the iron ore required for this purpose will be about 800,000 tons; total, of coke and coal, 1,500,000 tons. A coal miner, if he works steadily the whole year, can mine about 1,000 tons at an average; thus it will take at least 1,400 men to produce the fuel. The mining of the

ore, say 350,000 tons, will occupy 500 men, and the transportation of the different materials from place to place, 1,000 men. It is to be hoped that in time to come we will be our own manufacturers of tin plate. At present we send annually abroad for the article upwards of $12,000,000.

TWELVE MONTHS OF IMPORTS AND EXPORTS.

The report of the Bureau of Statistics of imports and exports for September completes a record of twelve months from the date when our foreign commerce began to make unfavorable comparisons with the movements of the same times of the previous year. During those twelve months the value of merchandise imported was $103,422,096 greater than for the preceeding twelve months ended on September 30, and the value of the merchandise exported was $149,598,000 less than for the preceeding twelve months—a startling difference of $253,020,096. For the twelve months ended September 30, 1881, the merchandise exports exceeded the imports $240,249,237; for the twelve months ended September 30, 1882, the imports exceeded the exports $12,770,859. The actual imports of merchandise were of the value of $749,155,795 as against 645,733,699 in the corresponding period of 1880-81, and the exports of merchandise, $736,384, 936, as against $885,982,936 in the previous corresponding period. The merchandise movement at the port of New York for October show imports to have been $41,981,657, and exports $34,249,998. The foreign movements of merchandise at New York the present month makes another unfavorable comparison for the port with the movements of the corresponding period last year.

AN English project which has for its aim nothing less than a revolution in the inland transportation of merchandise will probably be brought before Parliament for its sanction during the coming winter. It is not the scheme of penniless adventurers, but the well-considered enterprise of some of the ship-owners and merchants of Liverpool, who have already raised a guarantee fund. The project is designated "The Lancaster Plateway," and broadly stated, the proposal is to lay out a series of roadways, radiating from Liverpool, to the centers of manufacturing industries in South Lancashire, to carry along these roadways a double set of iron plates corresponding in width with the wheels of ordinary wagons, to set the loaded wagons on this smooth plateway and draw them by steam traction engines to their appointed destination. Passenger traffic is excluded from the scope of the scheme; it is confined entirely to goods, and the anticipation is that it will be possible to carry these at a much lower rate than is now charged by the railway companies. The movement has its origin and motive in the burdensome charges now levied, which have been the subject of persistent protest by all the commercial bodies of Liverpool. The chief saving will be in the handling of goods. The wagons, which will be similar to those in general use on ordinary roads except that the axles will be of the same length, will be loaded directly from the steamer or the factory, drawn by horses to the nearest station of the "plateway," and there attached to a long line of similar vehicles with an engine at its head. Arrived at their destination, horses will draw them to the factory or steamer. The metal plates will be laid in two parallel rows, with low flanges on the outer edge to keep the wagons on the track. It is thought that £35,000, ($175,000)a mile will construct and equip the plateway and that the cost of maintaining and operating it will be comparatively small.

THE second payment on the Nickel Plate road has been made by the late purchasers, and temporary arrangements have been made for terminal facilities at Chicago and Buffalo. No decisive information is as yet to hand as to whether Mr. Vanderbilt is behind or interested in the purchasing syndicate. It is affirmed that the road will be operated "in close harmony" with the C., C., C. & I., and Hocking Valley. It will assuredly be operated independently of Lake Shore interests. The Eastern relations will be close with the Lehigh Valley and Lackawanna & Western, and there is a probability of the syndicate co-operating with the Erie, New York Central, and West Shore and Buffalo.

JUDGING by the number of railroad cars for which orders have been given for various lines, there must be a veritable car famine. The western coke makers complain of insufficient means of transport. Their yards are heavily stocked, and in some instances consumers have been compelled to suspend operations for want of fuel, whilst in many cases customers failing of their orders being filled, have duplicated these, with the result of some confusion in the trade. But with the present activity of car works we may hope that this state of affairs will not last long. Cars were never being turned out on a larger scale than at the present time, and these, on the whole, are of improved construction.

MANUFACTURES.

TO MACHINISTS, MANUFACTURERS AND OTHERS.

THE publishers of THE TRADE REVIEW solicit items of information concerning manufacturing and other establishments in any part of the country, and all such items will be promptly inserted in these columns, free of charge. Facts are the only things needed; and all communications should be accompanied with the name of the contributor—not for publication—but as a guarantee of good faith.

Manufacturers, machinist and engineers are particularly requested to communicate any matters of interest relating to their specialties. No one need be deterred from sending any interesting facts in his own anguage, as all such contributions will be properly revised before sending to press.

OHIO INDUSTRIES.

CLEVELAND.

THE Deering Seamless Barrel Co., has been incorporated, with a capital of $100,000 in $100 shares; the Eden Type-case Foundry Co., capital, $50,000; also the Van Wie Manufacturing Co., capital $20,000.

THE mills of the Cleveland Milling Co.—formerly Hickox & Co.—having been idle for a year, during which time they have been entirely rebuilt and refitted, are again in operation. The property is located on Merwin street, both sides of German street. On the north side of German street is a large two-story frame building 50x150, extending back to the river, which is used as a storage warehouse for flour and barrels, and in which the offices of the company are located. On the opposite side of German street is the flour mill, which is a new six-story brick building, erected during tne past year, with a frontage of 110 feet, depth of 85 feet, and 90 feet in height. Connected with the mill in the rear is an elevator, with a storage capacity for 50,000 bushels of grain. The interior arrangements of the mill are of the most modern and complete character.

MR. GEO. MITTINGER, who carries on a manufactory for metal spinning in brass, copper, zinc, tin, &c., at 33 St. Clair street, commenced business in 1873. He is the only metal spinner in this city, and one of the most interesting mechanical sights is presented in the operations to be seen in his establishment. In the spinning process great dexterity and much ingenuity is required. Mr. Mittinger has had no less than 24 years experience in his art. He manufactures the "Star Cuspador," of which he is patentee. His trade is good; his manufactures are sold principally in Cleveland.

THE new turret lathe being built by James Atchison, is 13½ inches by 4 feet, and designed and put upon the market as a special tool to meet the wants of manufacturers of light brass work, telegraph and electric instrument makers, cylinder lubricators, valves, gasoline stove work, etc. Although particularly adapted for brass work, it can be advantageously used for other classes of work that require several tools and rapid handling. It is fitted with a hollow tapered steel spindle 15 inches long, pierced with a 17-32 inch hole. Gun metal boxes, front bearing 1½ inch diameter by 2¾ inches long, with adjustable nuts on both bearings. The cone has for speeds for 1½ inch belt. The turret is 6 inches in diameter, and is fitted for six tools, has 5-inch stroke.

THE Cleveland Diamond Fire Brick Co., Newburgh, the proprietors of which are Messrs. Wright & Knowles, have been in business six years. Their specialty is No. 1 brick. Their chief business is local, but they ship large quantities to Chicago and Eastern cities.

OHIO IN GENERAL.

A YEAR ago, or more, the Brier Hill Iron Co. Youngstown, began experimenting in the manufacture of spiegel eisen, an iron that is essential in the manufacture of steel, except crucible. One hundred thousand tons of this iron is used in this country every year. The above company has commenced the manufacture of spiegel in a furnace forty-five feet high, ten foot bosh. Spiegel eisen, "looking-glass iron," so called because its face is so bright that a person can almost see himself in it, is made from a mixture of Spanish and Lake Superior ores. Spiegel eisen looks like pig iron on the surface, but is very brittle and where broken is white as silver. It is about 80 per cent. iron and 20 manganese. It is very difficult to make it, and requires the utmost care and the ripest experience. This is the only furnace in the United States where spiegel eisen is made for the general market, The Edgar Thompson Steel Works, of Pittsburgh, and the Cambria Iron Works, at Johnstown, Pa., have been making it for their own use. The spiegel made at Brier Hill is said to be as good as any made anywhere on the face of the earth.

EVERY department of the Malleable Iron Works, Youngstown, is in active operation. The large additions now being made to the works are well under way, and it is thought will all be ready for occupancy within 30 days. In one of the new buildings will be the japaning and tinning departments, and upstairs the carpenter and pattern-making departments. The other addition, and the larger of the two, will be used as an addition to the molding department. Workmen are now at work building the furnaces, etc., in both buildings, and in the tinning department operations have really begun already, so great was the press of work. With the completion of these new additions and the extensive improvements they were built to give room to, the works will be as well equipped as any similar concern in the country for turning out work. This company is now paying considerable attention to the manufacture of harness snaps, seat rises, etc., and they are now making arrangements to manufacture a revolving wagon seat, an ingenious invention of J. C. Theakston, of Salem, Ohio.

THE improvement in the works of Jones, Waite & Co., potters, Akron, consist of an addition to the west end of their shop, 10 feet wide by 95 feet long; to the east end 12 feet by 50 feet, and to the south end 20 feet by 30 feet. These additions make them a shop 95 feet by 52 feet, commodious and well arranged in all respects, and amply supplied with first-class machinery.

THE Akron Strawboard Co., Akron, are running a double set of men and turning out a very large quantity of board. A new brick addition to the west end of the mill, 36x100 feet in dimensions, has just been completed, and will be used chiefly for a store-room, wherein board can be kept on hand and all orders promptly filled. Two very extensive machines are now being used and all grades of board, including covered board, are being made.

THE Valley Iron Works, of Leetonia, are flourishing. They employ 800 men, and have a monthly product of 1,500 tons, and 1,000 tons bars. They are rebuilding one of their furnaces and will make about 4,000 tons of pig iron per month when completed. Their American-Scotch pig iron is made from black band and shell ores, using as fuel, pure Wellingtonville coke. They claim it will do more work than imported Scotch will do and still make a stronger casting.

ALL three of the blast furnaces of Wellston are on to their full capacity, making their usual amount of good iron. The Wellston Furnace Co., has ten mines. Their shipping mine has about thirty miners at work. The Milton and Eliza Furnace Companies also ship some coal from their

mines at the furnace. The Patterson slope and the Fluchart shaft are running, but not making full time.

COLLINS & SON, Akron, are busy to the extent of their facilities in building first-class carriages. In elegance of design, the combination of lightness and strength, and excellence of material and construction they could not well be excelled. The firm employ 35 hands. Their trade is principally local, although they ship considerably.

THE Cincinnati Rolling Mill and Chain Works, established about seven years ago, and situated at the corner of Gist and C. H. & D. railway, manufacture refined bar iron from wrought scrap, also all kinds of hot wound, hand welded chain. They run 80 forges in the chain works, make 5,000 tons of bar iron per year, and employ 210 hands.

THE Jewett Brick Co., Akron, has just completed another fine Wintigar kiln, at an outlay of over $1,000 and now has the same ready for operation. The capacity of this kiln is 200,000 brick, while the combined capacity of their three kilns is 600-000. In addition to the new kiln, the necessary sheds have also been erected.

MEANS, KYLE & Co., of Hanging Rock, have contracted for a portion of the old Main Centennial Building for a stock house. They have the foundations for a furnace stack ready, and the Whitwell ovens and smoke stack up, and some other work in progress, but have made no contracts for machinery or ironwork of any kind.

THE Ravenna Flint Glass Co., of Ravenna, will begin making glass in about a week. They have an 8-pot patent teazer furnace, and will manufacture chimneys, with perhaps some other specialties later on. There are now two chimney factories in Ravenna, this and the Enterprise Glass Co.'s works.

THE following companies have been incorporated: The Taylor Drain Tile Co., Columbus, capital stock $1,000,000.——The Muskingum River Railway Co., Marietta, capital stock $50,000. This road will run from Zanesville, Muskingum county, to Marietta, Washington county.

THE foundations of the new mills of Seiberling & Co., Akron, are being prepared. The building will be 70x140 feet and 6 stories high. The second mill for flour will be 6 stories high and 70x100 feet in dimensions. The capacity of the former mill will be 600 barrels per day.

THE Joel Hayden Brass Co., Lorain, brass founders and finishers are not yet running complete but have some 380 hands employed upon globe valves, water faucets, steam whistles, engine trimmings and brasses and bronze castings. They make Hill's patent bibbs and Wilson's patent gate valves.

ONE of Tinius Olsen & Co.'s patent iron testing machines has recently been erected in the machine shop at Brown, Bonnell & Co.'s, Youngstown. It has a capacity of 200,000 pounds, and will be used exclusively for testing special orders, such as railroad and bridge iron.

THE new Gill gas furnace of the Buckeye Glass Company, at Martin's Ferry, will be 21 feet 4 inches in diameter, and of the capacity of 14 pots. They have now in use two old-fashioned furnaces, one of which will be torn down.

THE Corns Iron Co., operating the rolling mill at Girard, have filed a petition in the Court of Common Pleas, of Trumbull county, praying to have the corporate name changed to that of the Trumbull Iron Company.

A LARGE brick flouring mill is to be erected in Lowellville on the site of the mill which recently burned down there. A stock company with a capital of $40,000 has been organized for that purpose.

J. & J. M. GLEDHILL, Ravenna, are full of orders for the wooden goods they manufacture. They commenced operations fifteen years since, and have established a high reputation for their goods.

NAIL manufacturers at Youngstown are unable to supply the increased demand for nails. The average daily product of the nail factory at Brown, Bonnell & Co.'s works is 60,000 pounds.

WORK is progressing rapidly on the new Whitwell stoves at Belfont Furnace, Ironton. We understand they are about to erect a steam twist in place of their old water-balance.

THE Crescent Works at Pomeroy, are improving and changing their mill, intending to confine themselves to the exclusive manufacture of sheet and plate iron.

THE new works of the Excelsior Iron and Brass Co. will soon be completed. The company will manufacture switch and car locks, together with other specialties.

CLARK WOLFCALE, of Wolfcale, is remodeling his mill, and has placed his order for bolting cloth and gearing with the Lima Mill Furnishing Co., Lima, Ohio.

THE Rivet Co., Cuyahoga Falls, is putting in new machinery to increase the capacity for work if necessary and to do away as much as possible with night work.

THREE hundred tons of pig iron are used every day in supplying the puddling furnaces of Brown, Bonnell & Co., Youngstown.

THE Benjamin Bros'. rolling mills, at Cincinnati, have made an assignment. The bond of the assignee is fixed at $60,000.

THE Youngstown Steel Works are completed, and the erection of the machinery is being proceeded with.

THE building of the new glass works at Canton has been commenced on the land donated for the purpose.

THE car works of Milliken, Boyd & Co., Youngstown, are running full turn on several large orders.

THE Hall rolling mill, at Hubbard, has started up with 12 puddling furnaces and a finishing mill.

THE works of the King & Armstrong Varnish Works, Akron, are being rapidly proceeded with.

ALL the mills at Ironton are running, and shipping as fast as product is turned out.

THE Mingo Iron Works, Mingo Junction, are now lighted by electricity.

THE fires have been lighted at the Youngstown Steel Works.

THE Hall rolling mill at Hubbard is running double turn.

CANTON is going to have a tinware manufactory.

Rolling Mills and Steel Works.

WHITELY, FASLER & KELLEY, Springfield, Clarke county.—Building a Siemens-Martin steel plant and a mill to roll the product.

Number of rolling mills and steel works in Central Ohio: 7 completed, and 2 building. Of these, 4 are rail mills, 3 making light T rails only; 1 makes open-hearth steel, and 1 open-hearth steel works building.

COLUMBUS IRON WORKS, P. Hayden & Son, Columbus. Built in 1854; 12 single puddling furnaces, 5 heating furnaces, and 4 trains of rolls; product, merchant bars, splice bars, light T rails, wire of all kinds, and iron for harness and saddle work.

WARD IRON Co., New Philadelphia, Tuscarawas county.—Building a rolling mill to contain 20 single puddling furnaces, 4 heating furnaces, 4 trains of rolls; product, to be sheets, plates, bands, and small rounds and squares. James Ward, general manager.

MASSILLON ROLLING MILL, Joseph Corns & Son, lessees, Massillon, Stark county.—Built in 1873, and put in operation January 4, 1875; 8 single puddling furnaces, 2 heating furnaces, and 3 trains of rolls (one 9 and two 18 inch); product, bar iron and light T rails; annual capacity, 6,000 net tons.

DOVER ROLLING MILL, J. L. Edwards & Co., Canal Dover, Tuscarawas county.—Built in 1865-6; first iron rolled in February, 1866; 12 puddling furnaces, 1 heating furnace, and three trains of rolls; product, merchant bar iron; annual capacity, 6,000 net tons.

The following is the list of rolling mills and steel works in the interior counties of Ohio, with particulars as to their capacity, and notices of those being erected, as furnished in the Directory to the Iron and Steel Works of the United States, prepared by the American Iron and Steel Association:

COLUMBUS ROLLING MILL, Columbus Rolling Mill Co., Columbus, Franklin county. Built in 1872; 10 single puddling furnaces, 14 heating furnaces, and three trains of rolls; product, iron and steel rails; annual capacity, 40,000 net tons. S. Churchill, president; D. S. Gray, vice-president; W. A. Harrison, treasurer and general manager; W. S. S. Rodgers, secretary.

CHERRY VALLEY IRON WORKS, Leetonia, Columbiana county.—Formerly called Leetonia Iron and Coal Co. Built in 1871; 16 single puddling furnaces, 1 scrap furnace, 3 heating furnaces, and 3 heating furnaces, and three trains of rolls (one 8, one 16, and one 18-inch); product, muck bar, merchant bar, and guide iron; annual capacity, 10,000 net tons. J. H. King, president; C. N. Schmick, secretary and treasurer; J. G. Chamberlain, superintendent.

CANTON STEEL WORKS, Bolton Steel Company, Canton, Stark county.—Built in 1872; 8 heating furnaces, one 12-inch and one 20-inch train of rolls, three hammers, and one 6-gross-ton Siemens open-hearth steel furnace; product, patent rolled machinery steel, spring steel (oil and water temper), tire steel, and gun barrel and set-screw steel; speciality, tool steel; annual capacity, 3,350 net tons of steel ingots. Brand, "Canton." Ogden Bolton, president and superintendent; R. H. Bulley, vice-president; P. S. Sowers, secretary and treasurer; H. A. Weaver, mill manager.

ZANESVILLE IRON WORKS, Ohio Iron Co., Zanesville Iron Co., Zanesville, Muskingum county. The first mill of these works was built in 1848; present company was incorporated in 1857, and has operated the works since then; now comprise 22 single puddling furnaces, 2 scrap furnaces, 7 heating furnaces (all constructed so as to embrace the points covered by A. F. Cassel's improved patent furnace), 1 hammer, 2 spike machines, and 5 trains of rolls (two 8, one 10, and one 18-inch); product, assorted merchant bar iron, light T and street rails, and railroad spikes, specialty, agricultural irons; annual capacity, 14,000 net tons. M. Churchill, president; C. W. Greene, secretary and treasurer.

INDUSTRIES IN GENERAL.

MASSACHUSETTS.

MR. MARSHALL CUTLER, of Boston, is erecting chemical works in East Somerville.

THE Mattapoisett Manufacturing Co., of Mattapoisett, has been incorporated with a capital of $13,500, to erect buildings for the manufacture of jewelry, paper boxes and other light articles. William E. Sparrow is its president, Noah Hammond is its treasurer.

THE Lockwood Manufacturing Co., of East Boston, has received a contract to build a passenger and freight steamer for the Boston & Provincetown Steamship Company and fit her out with machinery. The steamer is to be 160 feet in length over all, twenty-seven feet beam and twelve feet hold. She will have commodious cabins and ten good state-rooms. Work on the machinery has been commenced.—*Manfrs. Gazette.*

THE works of the Deane Steam Pump Co., of Holyoke, are running over time, and are turning out from 100 to 125 pumps per month. They are also manufacturing a new condensing apparatus, which is spoken of very highly. It is claimed for it that it is economical to run, simple in construction and perfectly safe, and when used with a stationary engine will make a saving of from 20 to 30 per cent. of power.

VERMONT.

BURLINGTON stands a fair chance of getting a large factory for making paper from wood pulp. The concern, with a $250,000 capital, proposes to to put up buildings costing, with machinery, $150,-000, and Burlington is asked to give $20,000 worth of help.

CONNECTICUT.

WORK has begun on the main factory of the new Wilson Machine Co., at Wallingford. The cost of the factory will be $50,000.

THE Hendee Machine Co., of Torrington, will soon start a branch in Meriden for the manufacture of tools for several factories.

RHODE ISLAND.

POTS for tempering files are among the staples of Providence, and are sent to file makers in Philadelphia and Baltimore, as well as to those in New England cities.

THE Franklin Foundry and Machine Co., Providence, have issued a new catalogue of their specialties.

NEW YORK.

THE Syracuse Iron and Tube Co. have started

their works at East Syracuse, where they have a block of buildings 500x300, and are the only boiler-tube manufacturers in the State. Machinery to double the capacity of the works, additional furnaces, and a rolling mill will be added next season.

ONE of the leading industries of Syracuse is gun making. The capital invested is $95,000, and sales of $200,000 were realized last year.

THE Bushwick Glass Works Co., Brooklyn, are erecting a new furnace.

PENNSYLVANIA.

THE works for the manufacture of horse-shoes, at Catasauqua, will be in operation in about five weeks, when they will turn out horse shoes at the rate of ten a minute.

HUBBARD, Bakewell & Co. have built a large axe factory on the Allegheny river. The establishment consists of three buildings, the first 300x56 feet, the second 348x46 feet and the third 328x50 feet.

THE Edgar Thomson Steel Works, at Bradford, consume ninety cars of coke per day. They are the largest consumers in the market.

DURING the thirty days ended Saturday, October 14, one of the Isabella furnaces turned out 5,700 gross tons of pig iron.

THE BRYDEN HORSE SHOE Co., who for the past two years have had their shoes manufactured at the Colts Armory, in Hartford, Conn., have lately reorganized as the Bryden Forged Horse Shoe Works, with Joshua Hunt, of the Crane Iron Co., president, and Oliver Williams, of the Catasauqua Mfg. Co., treasurer, are now rapidly completing a new works of their own at Catasauqua.

THE Reading Company have received 24 of the 30 coal dirt burning locomotives lately ordered of the Baldwin Locomotive Works. The other six will be finished next month; 600 tons of coal dirt per day is being utilized by the company as fuel.

ILLINOIS.

THE new factory of the Chicago Rawhide Manufacturing Co. is being pushed rapidly towards completion.

THE Bourbon Spring Steam Gauge Works have been established in Chicago. They will manufacture a variety of steam and other gauges, pumps and thermometers,

THE Columbian Iron Foundry and Machine Tool Works will probably get into their new addition by the first of next year.

THOMAS M. HOWE & Co. is the title of a new firm organized in Chicago. They will make Babbitt and anti-friction metals, and brass castings.

VIRGINIA.

IN enumerating the industries of Richmond, the *Industrial South* says: The several iron and machine works of Richmond employ about 4,000 men and $1,642,000 capital. They turn out railroad material and bar iron in large quantities, and also most of the machinery used in other works and in the agriculture of the surrounding country. The fact that the woods used in such manufactures are quite as easily obtainable as the metals, makes it a doubly desirable place for that kind of work. The nail industry here is claimed to be the largest of any city in the South. The value of iron manufactures sold last year was over $5,330,000. The mills generally are increasing their capacity all the time, and large new shops are being erected for the building of locomotives and cars.

INDIANA.

THE Terre Haute Iron Nail Works, Terre Haute, have in operation eighty nail machines and twenty-four puddling and heating furnaces, which give employment to 360 men, and produce 222,000 kegs of nails annually. Some forty-six additional nail machines will be put in operation by the first of the year, which will increase the capacity to 350,000 kegs.

IOWA.

THE new Ottumwa Plow Co. are putting machinery in their new buildings, and will be turning out their improved cultivators by December 1.

THE shipments of the Comstock Stove Co., of Burlington, average 125 stoves per day.

A JOINT stock company has been formed in Council Bluffs for the purpose of manufacturing shot from iron. The company claim that thorough tests which have been made of their shot have proven it to be fully equal, and in some respects superior, to lead shot, and as it can be sold at a much lower price than lead shot, they will probably find a demand for all they can manufacture. No tower is required, as the shot is made by this process with less than 3 feet drop. The iron shot, it is said, cannot be distinguished from that made of lead.

MISSOURI.

MESSRS. HOOKER & COLVILLE, St. Louis, are meeting with most gratifying success in the pump business. They have recently taken orders for sixty railroad tank pumps from the Texas & St. Louis railroad, orders for ten from the Government for pile driving purposes, and for one large fire pump from the Excelsior Manufacturing Co. They are now perfecting plans for the erection of a new shop 150x120, and three stories high.

THE Globe File Works report a large increase in orders, and are unable to keep up with them.

THE St. Louis Wire Mill Co. are running their works twenty-two and one-half hours out of twenty-four, and are turning out about two car loads of wire per day of twenty-four hours.—*Age of Steel.*

MICHIGAN.

OUR Detroit correspondent writes: I was pleased to meet in Detroit D. H. Taylor, of the firm of Taylor & Williams, distillers and wholesale liquor dealers, 133 Third street, Louisville, Ky., who is well known throughout this section of country as putting up the finest bottled case goods. His leading brand is "Private Stock." Tue firm are very proud of their Old Nelson and Old Anderson Bourbon.

THE Colliau Furnace Co., furnace and cupola builders, 35, 36 and 37 Moffa building, Detroit, was established one and a half years since, and employs 35 hands. Trade is reported good.

F. O. WILLIAMS, of Coshocton, N. Y., who was offered $10,000 bonus some time ago to start an agricultural implement factory at Marshall, will commence operations at once. The factory will employ 50 men.

THE Grand Rapids Veneer and Panel Co., is the name of a new wood-working establishment recently located at Grand Rapids. The veneers, which will be an eight of an inch in thickness, will be cut from the log, and, for panels, will be glued together.

STEAM AND GAS FITTING.

CHAFER & BECKER,

Cleveland, O.

There is a vast amount of science in the proper fitting of piping, which involves also judgment as to area and proper length and arrangement. No ordinary care must be exercised in putting pipes in place if they are to be protected from strain, the ordinary source of leaky joints. Each different location calls for the exercise of special adaptations. Thus in locating feed pipes for boilers it is desirable to arrange them for the expansion of the boilers as well as for that of the pipes themselves. Again, a skillful practical fitter must in such case have a knowledge of the proper area for the pipe over that which is simply necessary to supply the boiler with water, sediment or scale being likely to form within, so reducing the carrying capacity. In steam and gas fitting few western firms have had more extended experience than Messrs. Chafer & Becker, of No. 8 Champlain st., and the extent to which their services have been put in request evidences the appreciation extended to them by contractors, builders and others. The rapid enlargement of their business has led to the erection of new buildings by the firm of more ample capacity. Their knowledge of piping secures the best quality and make, and they employ in fitting the most expert workmen obtainable, giving their whole time and energy as mechanicians to personally superintending the business. The scale on which they are putting up steam pipe is very great. Mr. Chafer has just been granted a patent on an Exhaust Steam Trap, which, in our opinion, has transcendant merits, and which we design illustrating in a future issue. We would advise all steam users to call and examine. The firm report that trade was never better than during the past season. They have just finished a job of steam heating for the Globe Iron Works, Thomas Manning's machine shop, the Northern Ohio Woolen Mills, and John Bousfield's residence on the West Side. They are about completing a job for Lamson, Sessions & Co., also Sherwin Williams & Co.

FOREIGN CORRESPONDENCE.

ENGLAND.

BIRMINGHAM, October 21.

The agitation going on for some time past amongst both colliers and ironworkers for advances in wages made it apparent to all those connected with the trade that an advance in iron must take place sooner or later, and it appeared to be pretty well understood that in consequence of such demands on the part of the men the price of marked bars would have to be advanced at the quarterly meeting which took place in this city, when leading makers advanced the price 10s. Makers assert that with the rise in coal of 1s. per ton and dearer pigs, it is a matter of necessity to advance their prices, but it is generally known that some of them are not very fully booked and would prefer keeping prices unchanged. It has been stated that the advance was somewhat premature, and that it would have been far healthier if it had been forced up by demand being greater than supply. I certainly cannot say that this is the case, but a glance at the Board of Trade returns for the past nine months will show that demand and supply are much closer than they have been for a long time past. Commencing with pig iron, the diminution of stocks during the present year has been little short of marvelous, owing to the enormously increased shipments, backed up by a large internal consumption, and it is considered on all hands that the condition of that branch of the trade is exceptionally healthy at the present time. The growth in the iron shipbuilding trade during the period above mentioned is simply astonishing, and might almost lead to the conclusion that it had been overdone altogether. Taking the facts, therefore, as they stand, an advance of 5s. per ton in pig iron, and 10s. per ton in finished iron, cannot be considered as too severe a measure.

The Glasgow market has been flat this week, and the value of warrants has drooped from 50s. 11d., at which it closed last week, to 50s. 9d., a fall of 2d. per ton this week. It is generally understood that the weakness of the Glasgow market is owing to the action of speculators, but the fact must not be overlooked that the shipping season is now rapidly drawing to a close.

Tinplates continue in fair demand, with an upward tendency in prices. At the Birmingham meeting last week makers' quotations were generally 17s. per box for common cokes, but this was considered a full price, and any business put through was probably somewhat under that figure. The increased cost of material can only leave a small margin of profit for the manufacturers even at 17s. The stocks again show a reduction, and the prospects of the trade for the remaining months of the year may be said to be satisfactory, if not highly encouraging.

ITEMS OF INTEREST.

A NEW industry springing up in the South is the manufacture of sulphuric acid from iron pyrites.

THE butter product of the United States is estimated at, in round numbers, 800,000,000 annually.

OVER one-half of the new manufactories started in the South during the past two years belong to Northern capitalists.

ELEVEN hundred and forty trains pass the signal tower of the Pennsylvania Railroad at the junction of Seventeeth and Filbert streets, Philadelphia; the largest number that passes any given point in the world.

THE Lake Superior shipments to October 25, include 598,569 tons from Marquette county mines, and 981,277 tons from Menominee Range mines; total, 1,579,846 tons.

THIS is the way the engineer explained the Lawrence engine governor: "When the fat side of the big eccentric is opposite the fat side of the little eccentric, she slows up; but when the two fat sides pull together, she pegs away at full stroke."

AN American, "name withheld," has bought up large tracts of land in the neighborhood of Bellegarde, France, through which the Rhone flows subterraneously. He is diverting it from its underground passage and channeling it in a direction where its power can be used for working any amount of machinery. The enterprise is attracting much attention from those engaged in industrial pursuits, and the inhabitants of Bellegarde believe that it will ere long make it a thriving town.

REVIEWS.

LITTLE DIGNITY. By Virginia Gerson. New York: George Routledge & Sons, 9 Lafayette Place.

This is a child's book of a most attractive character, the tasteful and elegant character of which well fits it for a present. Each page has a ditty illustrated in half page colored scenes in all of which children figure. "The triumph of art is to conceal art," and the simple way in which striking effects are brought out, will excite the admiration of even those skilled in the use ot the pencil and the brush. The pictures afford veritable studies of harmonising and contrasting colors. The work, including cover, is got up typographically and artistically in the elegant style characteristic of the publications of the eminent publishers.

THE TREATMENT OF STEEL. Pittsburgh: Miller, Metcalf and Parkin.

This work consists of a series of circulars on heating, annealing, forging and tempering that have been issued from time to time by the Crescent Steel Works of Pittsburgh, and which are here brought together in a handy volume. As dealing with the correct treatment and management of steel by practical manufacturers it has a value that would not attach to any mere theoretical treatise. At the same time the scientific principles underlying that treatment and management are expounded. A valuable portion of the work is in the directions it offers for overcoming difficulties connected with the working of steel. From the chapter on Annealing we make the following extract:

If a chill be heated red hot and removed from the fire as soon as it is hot, it will, when cold, retain its peculiar crystalline structure; if now it be heated red hot, and left at a moderate red for several hours; in short, if it be treated as steel often is, and be left in a furnace over night, it will be found, when cold, to have a perfect amorphous structure, every trace of chill crystals will be gone, and the whole piece will be non-crystalline gray cast iron. If this is the effect upon coarse cast iron, what better is to be expected from fine cast steel? A piece of fine tap steel after having been in a furnace over night will act as follows: It will be harsh in the lathe and spoil the cutting tools. When hardened it will almost certainly crack; if it does not crack it will have been a remarkably good steel to begin with. When the temper is drawn to the proper color and the tap is put into use, the teeth will either crumble off or crush down like so much lead. Upon breaking the tap the grain will be coarse and the steel brittle. To anneal any piece of steel, heat it red hot; heat it uniformly and heat it through, taking care not to let the ends and corners get too hot. As soon as it is hot take it out of the fire. the sooner the better, and cool it as slowly as possible. A good rule for heating is to heat it at so low a red that when the piece is cold it will still show the blue gloss of the oxide that was put there by the hammer or the rolls. Steel annealed in this way will cut very soft; it will harden very hard, without cracking, and when tempered it will be very strong, nicely refined and will hold a keen, strong edge.

The directions are very clear as to the best mode of heating steel.

Bear in mind, that for every variation of heat which is great enough to be seen, there will result a variation in grain, which may be seen by breaking the piece, and for every such variation in temperature there is a very good chance for a crack to be seen. Many a costly tool is ruined by inattention to this point. The effect of too high heat is to open the grain, to make the steel coarse. The effect of an irregular heat is to cause irregular grain, irregular strains, and cracks. As soon as the piece is properly heated for hardening it should be promptly and thoroughly quenched in plenty of the cooling medium, water, brine or oil, as the case may be. An abundance of the cooling bath, to do the work quickly and uniformly all over, is very necessary to good and safe work, To harden a large piece safely a running stream should be used. Much uneven hardening is caused by the use of too small baths. For the third stage of heating; to temper, the first important requisite is again uniformity. The next is time; the more slowly a piece is brought down to its temper, the better and safer is the operation. When expensive tools, such as taps, rose cutters, etc., are to be made, it is a wise precaution, and one easily taken, to try small pieces of the steel at different temperatures, so as to find out how low a heat will give the necessary hardness. The lowest heat is the best for any steel, the test costs nothing, takes very little time, and very often saves considerable losses.

The effects of heat on steel are separately dealt with and illustrated in an interesting diagram. The construction and management of furnaces come in for a full share of attention, the text relating to them being aided by illustrations. One of the most valuable sections is on temper of steel, to which we design hereafter to do full justice in treating specially of the subject. The question as to "Why does Steel Harden?" is fairly grappled with, and this portion of the work will excite the general attention of iron and steel manufacturers as well as metallurgical scientists. There is no better aid to research than the experience of your practical man. It is evident that a vast amount of research has been brought to bear on the solution of the problem. Results and their causes are presented in terse and clear language. The vast body of information presented in small compass renders this a model of what a work on steel for handy reference should be.

LUMBERMAN. Chicago: The Lumberman Publishing Co.

This is an attractive hand-book by the Editor of our able contemporary, the *Northwestern Lumberman*, Mr. W. B. Judson. Pages of colored diagrams, affording valuable statistical information, in graphic form, are given. It includes the productions of different States. There is a diagram showing the average prices of white pine lumber by cargo at Chicago for 10 years, and another the estimated amounts of Long Leaf Yellow Pine standing May 31, 1880. The work is got up by the company in a most tasteful manner and is presented to the subscribers to their journal and the trade generally One valuable feature is the list of the lumber trade publications issued by the publishers, and which are designed to facilitate transactions.

RAILROADS.

FREIGHT business between Cleveland and Canton is very heavy.

THE Nickel Plate has secured right of way over the Bee line at a cost of $75,000.

THE earnings of the Blue Grass Route of Ohio, were $11,402.06 more for the first three weeks of October than for the same period last year.

THE Pittsburgh, Cleveland & Youngstown rail road, which will soon be completed to Steubenville, will be pushed down the river below Mingo, and after crossing the Ohio will pass up Cross creek and connect with the Pittsburgh & Southern.

FATHERS often make a great mistake in bringing up their sons to follow their own trade. A Philadelphia trunk-maker was wiser. He had 10 sons, and all are now baggage-men on railroad passenger trains. That trunk-maker is getting rich.

THE last grand excursion to Kansas and Nebraska will take place on Tuesday, November 14, 1882, via C., Mt., V. & D., Blue Grass Route of Ohio, and I., B & W., railroads. Excursion tickets to Independence, Baxter Springs, Florence, Kan, Lincoln and Columbus, Nebraska, will be sold on the above date from all coupon stations on the C., Mt. V. &. railway, at exceedingly low rates. The tickets are good returning 40 days from date.

THE English stockholders of the C., C., C. & I., have written to president Devereux inquiring anxiously about the prospects for a dividend on the stock. The last dividend was payable February 1. It is understood that President Devereux replied to the effect that a large expenditure for the stock of the Cincinnati, Hamilton & Dayton railroad, amounting to $671,186, the large advance to the Indianapolis & St. Louis and the Cincinnati & Springfield roads, and the great outlay for the improvements of the road bed of the Cleveland, Columbus, Cincinnati & Indianapolis had disposed of the net earnings. The condition of the road is very good now and hopes were given of a dividend February 1.

THE management of the Connotton Valley railway are satisfied that the road must be pushed on ward to Zanesville and the Hocking Valley; that the gauge must be changed from narrow to standard; and that it is at once unjust and inexpedient to call for a forced assessment from the already discouraged security holders. From a point seven miles this side of Zanesville to a point fifteen miles beyond that city the rails of the Muskingum road can be used, saving the building of twenty-two miles new track by the Connotton, and would leave but fourteen miles to be constructed to carry the line into the Hocking Valley. To carry out this programme will, in the opinion of the leading members of the management, require from $850,000 to $1,000,000. If there is to be any profit in the enterprise it will only come from the completion of the line to Zanesville and the Hocking Valley on a substantially standard gauge basis. As it is, both ends of the line are in the air, the Cleveland entrance being as yet incomplete, although the gap will soon be closed.

MECHANICAL RECEIPTS AND ITEMS.

To Plug Leaky Tubes.

To plug leaky boiler tubes, if the leak is near the head, fit and drive in a short ferrule; if the leak is in the bottom of the tube where a band cannot be bolted around it, take it out and put in a new tube.

Enameling Cast Iron.

For iron pipes twenty-eight parts by weight of silica, eleven of calcined carbonate of soda, and six of carbonate of lime. Another: 34 parts of silica, 11 parts carbonate of soda, 12 of chalk and 11 of dried pipe clay, to which boracic or oxide of lead can be added when a more vitrious enamel is required. The core forming the inner surface of the pipe, and, if desirable, the mold also, is coated with black lead, and the enamel as a powder or paste is applied to the thickness required. The molten iron causes the enamel to soften and firmly adhere to the iron. If it is not necessary that the enamel should be smooth, the black lead may be omitted.

Protection of Water Pipes.

Bursting of water pipes by frost may be prevented. The proposal is to use pipes of an elliptical or other than round section. As the sectional area of an elliptical pipe is less than that of a round pipe of equal perimeter, it is obvious that when the enclosed water freezes and expands, the section of an elliptical pipe will more nearly approach a circle. There is more, however, in the idea than at first sight appears. When the water in a round pipe freezes and the pipe begins to stretch at any point, it becomes larger in diameter and thinner there than elsewhere; each of these effects causes the pipe to be still weaker at the place affected; therefore, a round pipe is in a state of unstable equilibrium. With elliptical piping the case is different. The force required to alter the shape of an elliptical pipe increases as its section changes from the elliptical shape toward the circular; therefore, the effect produced by a change of shape at any place makes that place stronger. An elliptical pipe is therefore in a state of stable equilibrium, and will change its form uniformly from end to end. This fact is of great importance, as, if a portion only of the pipe is exposed to the cold, the whole is effective, and it will require a proportionately greater number of frosts to make the pipe round. An inspection of the pipes every two or three years will give absolute security, for as soon as they show signs of becoming round, they can be squeezed back again to their original section. Experiments are said to have confirmed these theoretical deductions.

Polishing Metals.

Metals are polished either by burnishing or buffing. The process of burnishing consists in rubbing down all the minute roughnesses by means of a highly polished steel or agate tool—none of the metal being removed. The action of the burnisher appears to depend upon two circumstances; first, that the harder the material to be polished the greater lustre it will receive; the burnisher is, therefore, commonly made of hardened steel, which exceeds in hardness nearly every metallic body. And secondly, its action depends on the intimacy of the contact betwixt the burnisher and the work; and the pressure of the brightened burnisher being, in reality, from its rounded or elliptical section, exerted upon only one mathematical line or point of the work at a time, it acts with great pressure and in a manner distinctly analogous to the steel die used in making coin; in which latter case the dull but smooth blank becomes instantly the bright and lustrous coin, in virtue of the intimate contact produced in the coining press between the entire surface of the blank and that of the highly polished die. It by no means follows, however, that the burnisher will produce highly finished surfaces, unless they have been previously rendered smooth, and proper for the application of this instrument, as a rough surface, having any file marks or scratches, will exhibit the original defects, notwithstanding that they may be glossed over with the burnisher which follows every irregularity; and excessive pressure, which might be expected to correct the evil as in coining, only fills the work with furrows, or produces an irregular indented surface, which by workmen is said to be full of utters. Therefore, the greater the degree of excellence that is required in burnished works, the more carefully should they be smoothed before the application of the burnisher.

PRACTICAL MECHANICS.

SURFACE PAINTING.

By C. E. Felch.

Surface painting may be properly divided into two classes. The first has for its end beauty and elegance; the second, durability. In the first durability is in a large degree sacrificed to effect; in the second, with which we have to deal, extreme durability is required, and with the present system of doing hurried work a method of procedure must be adopted that will give the best results in the shortest possible space of time. The work, however, will of necessity lack the elegant finish required in fine carriage painting. While I do not claim to put forward anything startlingly new or original, yet I shall endeavor to give in outline a simple and expeditious method of surface painting as applied to railway cars. Leaving the patent primers to be properly advertised by their respective proprietors, I shall fall back on the good old-fashioned lead-and-oil priming. For sufficient paint to prime an ordinary passenger coach certainly one-half the liquid used should be raw oil; and here I would say that the quality of your oil should be, like Cæsar's wife—above suspicion. Less than half a pint of japan gold size will dry and bind the priming so that puttying may be proceeded with in 48 hours. Putty made of one-half keg-lead and one-half dry, with good rubbing varnish and gold size to bind it, will give very little trouble from shrinkage. It is a very good plan to fill large holes half full and allow this to harden before filling quite full. After sand-papering, a second coat of paint should be given, with the addition of enough raw oil to insure its drying with a slight egg shell gloss. If very much hurried this coat may be omitted and a knifing coat applied at once. This coat should be somewhat thicker than for ordinary coating, applied roughly with a brush and allowed a little time to set. Then it should be knifed in with a broad-bladed filling knife, and a piece of sole leather for corners and moldings. Coarse-grained woods like oak or ash are pertectly filled with one coat. After sand-papering thoroughly the car is ready for color. It would be difficult to establish any fixed rule for the quantity of liquids to be used, especially in colors composed principally of lead, as hardly any two brands are ground of the same consistency. But no more oil should be used than will dry soon enough to admit of another coat being given in 24 hours. To apply a coat of light color without brush marks it will be necessary to use a flat badger flowing brush as a blender, after laying the color with an ordinary brush. Dark colors like umbers and lakes should, of course, be laid with a flat camel's hair. The car having received the requisite number of coats to make a solid body is ready for decoration. After this, a coat of finishing varnish, with the addition of perhaps one-fourth rubbing is to be applied, and, when dry, rubbed sufficiently to remove the gloss; follow with a heavy coat of clear finishing varnish, and the job is complete. I may state, in conclusion, that cars painted by this method, and run out twelve months ago, are in good condition at the present time.

How Belts are Made.

The manufacture of leather belts for transmitting power is yearly becoming an industry of greater importance. A visit to one of the large factories gives an insight into the processes by which the rough, oak-tanned hides are transformed into the mechanism of transmission. The hides, as they come in, are nearly as thick as one's hand, rough and stiff. After being weighed, they go into the basement and into a large tank, where they soak for several hours. From the vat they go into a great revolving wheel of wood, 10 feet in diameter and 5 feet wide. The interior of this wheel is lined with cherry, secured with screws, that the stock may not become discolored, and on the inner surface are a multitude of blunt-headed wooden pins. On these the leather continually strikes as the wheel goes round, until it becomes very pliable. This is called the wheeling process. Next the leather goes to the knife man, a very expert operator, who, with a big and very sharp instrument, shaves off the soft or fleshy part from the under side. Thence it goes to the rolling machine, which presses out such water as it has absorbed, and next it is subjected to the scouring machine, a ponderous piece of mechanism resting on stone piers, sunk 8 feet below the basement level, which cleanses it of all dirt. The thick, strong material is now as soft to the touch and flexible almost as glove kid. It has done with the basement, and goes to the fourth floor, where it is put through the remainder of the currying process such as stuffing and resetting. Then it goes down to the second floor, and to the head currier, who prepares the leather in convenient widths for stretching. Part of this floor is the drying-room, with a false floor of slats, under which are steam pipes, by which the leather is subjected to a high temperature after it has been tightly and smoothly stretched in frames. In this the most careful treatment is requisite, that there may be no stretch to the belt when finished. Next, it is stoned and brushed. The stone, by a curious machine, rubs the strip of leather with very rapid motion; the brush is a cylinder with closely-set bristles, making 3,000 revolutions a minute. This operation renders the leather very smooth and glossy. It is now at last ready for the belt make. It is cut into different widths, and the laps prepared for the presses, by which the ends of the strips are pressed together with a very strong cement made for the purpose. It then goes to the riveting table, where it is riveted and measured, and next to the winding machine, which forms it into rolls and trims the edges. Double belts are formed by cementing and riveting together two thicknesses of leather, prepared in the same manner as for single belts. To thoroughly cement the thicknesses a press of enormous power is used.

INDUSTRIAL SCIENCE.

Steam Boilers in Iron Works.

It is not uncommon to find boilers 50 and 60 feet in length of the plain cylinder type. They are heated by gases taken from the top of the cupola furnace, which enters the boiler under some pressure and "licks" the bottom of the boiler its entire length. These boilers have usually been supported at three points, one at each end and one in the middle. This is apparently a proper disposition of the supports, but in use it is found to develop some features that are liable to result in accident. When the heated gases are brought in contact with the boiler bottom, this part is raised to a temperature greatly in excess of the top of the boiler, and by greater expansion, corresponding to the excess of temperature, the boiler becomes curved in the direction of its length. By this process, the ends being thrown up, the entire load is thrown upon the center support, and this being unable to carry the heavy burden imposed upon it sometimes breaks away, and the shock—the boiler being under the working pressure of steam—has, in a number of instances, broken the boiler at the girth seams, and great destruction followed. When a plain cylinder boiler supported at the ends breaks at a girth-seam, there is nothing to prevent the two portions flying in opposite directions, and when the center support of the boiler breaks, and a fracture occurs at any of the girth-seams, the condition of the boiler becomes very dangerous. Unless the fires are stopped at once and the pressure reduced, it is liable to part and fly off. But this defect may not be discovered until too late to prevent disaster. An accident occurred in the Mahoning Valley, Ohio, several years ago, which had its origin in the breaking away of the central support of a boiler 50 feet long. This was in a battery of ten boilers, and the breaking or explosion of one broke the steam connections of the others, suddenly releasing the steam, besides knocking them more or less out of place, until nine of the ten boilers left their settings and were scattered in fragments over a wide territory. Great destruction resulted. Freight cars, trestle-work and bridges were demolished and the buildings were much damaged. This accident led to an investigation into the best methods of supporting these long boilers. The point to be attained is to so support the boiler that the load will be properly distributed under the changes of form to which the boiler may be liable under heat. If the boiler is rigidly bound to its supports, it will not rest easy. An improvement on the old plan is to have two supports at each end, properly distributed with reference to weight.

NEW SCREW NAIL.—A screw-nail invented by Henry Dunham, Abingdon, Mass., has a tapering and twisted shank and a clinched point.

CORRY CITY IRON WORKS (LIMITED).

BOILERS AND ENGINES.

Corry, Pa.

The Corry City Iron Works Company, Corry, Pa., manufacturers of boilers and engines, of which Mr. P. I. Lynch is President, and Mr. D. A. Cypher Secretary and Treasurer, properly ranks among the representative manufacturing interests of the country. The works are sightly and effective externally, and within the visitor witnesses a scene of busy industry, every department being in full swing, and facilities taxed to the utmost. The well arranged, compact and complete mechanical department exhibits a lively sight in the working of gigantic lathes, planing, drilling and screwing machines. The smithy, with its forges and steam hammers is ever a lively sight. The department in which the par s of engines and boilers are put together, sends forth a deafening sound. It is gratifying to find the activity, energy and enterprise of the company meeting their reward. They have steadily increased their business from date of starting, and are just now completing a large shop two stories in height, for the exclusive manufacture of steam engines, of 40x60. So driven have they been for a long period with orders, that it has been with the greatest difficulty that these have been filled with promptitude. The new enlargement of their buildings will greatly aid them in this respect, and we may anticipate that it is but the precursor to still larger extensions. The reputation they have achieved for excellence of material and workmanship, as well as skill in construction, assures a progressive development of their trade. The company employs 50 hands.

RUSSELL LIME AND PLASTER COMPANY,

Cleveland, Ohio.

The Russell Lime and Plaster Co. of this city have achieved an important position as manufacturers of white lime, carrying on at the same time an extensive business in land and calcined plaster, cement and hair. The manufacture of good lime is quite as much a chemical as a mechanical business, depending, as it does, on the qualities of the material itself. The stone used by the company is obtained from the Clemons quarries, Marble Head, and as the result of a careful analysis made by Professor J. L. Cassels, the eminent chemist of the Cleveland Medical College, it is found to contain 5 1-0 per cent. more lime than any rock analyzed; it contains 4 92-100 per cent. less magnesia with less organic matter, two-thirds less silica, and not a trace of iron. It makes the whitest and best lime used. Professor Cassels remarks at the outset of his report: "Lime with water, as is well known, readily unites with fine sand, forming a hard silicate of lime or cement, without the use of heat. Magnesia will not thus unite short of a red heat; hence its presence, beyond a certain per cent., although adding to its whiteness, detracts from its value as a cement. The larger the percentage of lime, all other things being equal, the stronger the cement, while the greater the amount of magnesia the weaker its cementing powers. The limestone of the south-west part of Lake Erie, from whence Cleveland is supplied, all contain magnesia, but vary exceedingly in different localities; consequently there is a vast difference of real value of the lime obtained from these sections for building purposes." The exhibits he presents of the ingredients of other limestones found in the Cleveland market fully substantiate the claims put forth by the Russell company for the excellence of their lime. They are in possession, in fact, of an exceedingly valuable rock, either for lime or building material, especially when exposed to the action of water. For lime purposes the small percentage of magnesia and silex renders it strong; and these, too, adds much to its value as a furnace flux. In examining the analyses we discover the important circumstance that the lime in question from the Clemons quarries contains no iron, which where present, and there are few limes free from it exerts, a discoloring and disintegrating effect from the opera tion of air and moisture. The kilns of the company are built upon the latest and most improved plan. Mr. C. L. Russell, the able superintendent, accommodates the trade by shipping the lime over all roads by the barrel, if desired, as well as in bulk. The barrels are new and made expressly for the trade. A thorough business man, his aim is to give customers complete satisfaction. The company report trade excellent. They are now making 30,000 bushels per month.

SCIENCE AND INVENTION.

. EXTINGUISHING FIRES.—A recent English patent relates to extinguishing fire in the use of atmospheric air deprived of its oxygen, and vitiated with carbonic gas and other products of combustion by being passed over or through a fire. The air, so vitiated, is forced into or through the burning structure.

MEASURING A COMPLETE DOUBLE STROKE.—A Madgeburgh inventor has secured a patent upon an indicator with duplicate pistons, springs and cylinders, which is connected to both ends of the cylinder, so as to produce a figure that shall show the amount of work done in a complete double stroke.

PLATING PAPIER MACHE.—A. J. Mann covers objects manufactured from vegetable pulp with a metallic layer by the following process: The object to be covered is first impregnated with a watery extract of linseed. It is then treated with nitrate of silver and sulphuret of hydrogen, and finally covered with metal by the galvanic process.

LINED VALVE CASES.—A recent German patent relates to valves whose cases or bodies are protected against chemical action by a protective coating, the object being to coat or line such hollow articles when cast in one piece. The castings are so made as to allow of cores of the most plain and simple forms being readily introduced and removed from all the hollow spaces that are to lined.

A NEW PISTON.—A patent has just been taken out in Germany for an engine the piston of which is driven backward and forward by small charges of gunpowder, supplied at each end by an automatic arrangement. The ignition is effected by the motion of the piston, which draws in a flame of gas or spirit, the access being regulated by side valves, which also open outlets for the escape of the gases of combustion.

REFINING SUGAR.—Granulated sugar is now successfully produced on the sugar plantations in the Sonth by a newly invented process consisting of a patented granulator or dryer. The sugar is taken as it comes from the centrifugals and dumped at once into the hopper of the machine, from which, after the lapse of only a few minutes, it comes out the dried sugar known in the market as "granulated.

CONTROLLING THE MOTIVE POWER OF ENGINES.—In a recent English arrangement the cut-off eccentric can be adjusted angularly on the shaft by means of gearing operated by a wheel mounted upon the same shaft. This wheel has arms that embrace a stationary friction surface with greater or lesser degrees of force, according to the pressure put upon them by the centrifugal power of certain weights within the wheel. When the speed is great the wheel is retarded and turns the eccentric to cut off the steam at an earlier point in the stroke.

CORK BRICKS FOR COVERING BOILERS.—At the Nurnberg Exhibition was shown a novel use of bricks of cork. These bricks have hitherto only been used for building purposes, on account of their lightness and isolating properties; but they are now also employed as a covering for boilers, and are said to excel even asbestos in preventing the radiation of heat. They are stated to be very cheap, being prepared of small cork refuse and isolating cement. At Nurnberg the application of cork bricks was largely shown. The usual size of cork bricks is 10 by 4¾ by 2½ inches.

NEW SINKING MACHINE.—A machine for sinking a heavy bucket through quicksand, and raising it rapidly to the surface, has been patented by Mr. Oscar Rust, of St. Joseph, Mo. The driving shaft of the machine is located at the base of the drilling frame on a level with the fulcrum of the drill operating lever. The winding drum of the slush bucket is located nearly above the driving shaft, and is geared to it by means of sprocket wheels and a chain, while the drum for the drill rope is placed at the end of the frame opposite the driving shaft, and is geared to the winding drum of the slush bucket. This drum is placed loosely and slides upon a feather upon its shaft, and has a shifting lever, and suitable clutches to transmit power from the driving shaft to the drum of the drill rope. The full power of the machine can thus be applied to lift and drop the bucket to cause it to penetrate the sand.

THE SQUATORGANOMOTOR.—At a recent exhibition in Germany, there was exhibited a novel device for running a sewing machine. It is said to be of German origin, though something of a similar design was patented in this country a few years ago. The motor is in the shape of a chair, and is operated by the weight of a person sitting upon it. To the seat is fastened a rack, and as the rack is gradually forced down by the weight of the operator, motion is communicated to the sewing machine through the medium of pinions, wheels, levers, etc. When the seat has reached the limit of its travel downward the operator rises to her feet, whereupon the seat is forced upward by a spring, ready to be "set down upon" again. There is nothing impracticable about this motor. If properly constructed, it will run a sewing machine, though as the operator slowly recedes from sight behind the machine and then suddenly "bobs up serenely," she must feel that she is experiencing more of the ups and downs of life than fall to the lot of those who adhere to the old-fashioned treadle.

COLUMBUS, Hocking Valley and Toledo Railway. Capital stock, $10,316,500, and first consolidated mortgage bonds, $14,500,000, of which amount $6,500,000 are held by the trustee for retirement of an equal amount of divisional bonds. These bonds are secured by a consolidated mortgage upon the entire railway property, and by the first and only mortgage upon its coal lands and all other property it may hereafter acquire. They are dated September 1st, 1881, and are payable in 1931, bearing interest at 5 per cent. The company operates 322 miles of road of standard gauge. During the year 1881 it earned $2,519,794, and its operating expenses were 52.75 per cent., $1,329,137, leaving net earnings, $1,190,657. Its total fixed charges amounted to $656,874, leaving a surplus (expended on improvements) of $533,783. It has earned during the eight months ended August 31st, $1,803,844, being an increase over the corresponding period in 1881 of $340,359. It claims to have no floating debt.

USEFUL RECEIPTS.

TO DETECT FUSEL OILS.—To detect fusel oil in alcohol Dr. A. Jorissen adds to 10 c. c. of the sample 10 drops of officinal hydrochloric acid. If fusel is present, a red color soon appears.

TO PRODUCE GOLD LEAF SHADES.—To produce light and dark shades of gold leaf the metal is alloyed with silver and copper. The addition of the baser metals lessens the malleability, and as the leaf is sold by superficial measure and not by weight, adulteration is kept at the minimum.

ADHESION GREASE FOR BELTS.—The following grease is employed at the government coal mines at Saarbrucken to preserve driving straps and prevent slips: 1 pound of melted tallow is mixed with 3 pounds of train oil, and to this 1.5 pound of finely-powdered resin is added, the mixture being stirred till cold. It is stated to give very satisfactory results, and is inexpensive.

A BRILLIANT BLACK ON IRON.—A brilliant black can, it is said, be produced on iron and steel by applying, witn a fine hair brush, a mixture of turpentine and sulphur boiled together. When the turpentine evaporates there remains on the metal a thin layer of sulphur, which unites closely with the iron when heated for a time over a spirit or gas flame. This varnish protects the metal perfectly, and is quite durable.

ETCHING LIQUID FOR STEEL.—Mix 1 oz. sulphate of copper, ¼ oz. of alum, and ½ a teaspaonful of salt reduced to powder, with one gill of vinegar and 20 drops of nitric acid. This liquid may be used for either eating deeply into the metal or for imparting a beautiful frosted appearance to the surface, according to the time it is allowed to act. Cover the parts you wish to protect from its influence with beeswax, tallow, or some similar substance.

GOOD SURFACE FOR VARNISH.—A good surface may be produced on unpainted wood by the following treatment: Glass-paper the wood thoroughly as for French polishing, size it, and lay on a coat of varnish, very thin, with a piece of sponge or wadding covered with a piece of linen rag. When dry rub down with pumice dust, and apply a second coat of varnish. Three or four coats should produce a surface almost equal to French polish, if the varnish is good and the pumice dust be well applied between each coat. The use of a sponge or wadding instead of a brush aids in preventing the streaky appearance usually seen.

THE Cleveland, Youngstown & Pittsburgh Railway Co., has by purchase and consolidation acquired the rights and properties of the Alliance & Lake Erie Railroad and the Steubenville, Canton & Cleveland Railroad, with the latter's title to its 3,000 acres of coal lands, situated at Richmond in the vicinity of Salineville, thus giving the Cleveland, Youngstown & Pittsburgh Railway Co., a short line between Lake Erie and the Ohio River.

THE court of appeals at Albany, N. Y. has reversed the judgement of the lower courts and ordered a new trial to determine the question of damages in the case of Storey vs. New York Elevated Railroad Co. Storey claimed to own a part of the street in front of his property, and sued the road for damages on the theory that the corporation was guilty of trespass. The decision is that of a bare majority of the court.

THE Elevated Railways of New York, from October 1, 1879, to September 30, 1880, carried 60,831,756 passengers, with cash receipts of $4,612,975.56. From October 1, 1880, to September 30, 1881 they carried 75,585,778 passengers, $5,311,074.85 receipts. From October 1, 1881, to September 30, 1882, they carried 86,361,020 passengers with $6,97,733.41 receipts.

OUR able contemporary, the *Boston Manufacturers' Gazette*, in the course of its exhaustive notes on the Institute Fair, says: The Holt hoop-cutting machine continues to delight all who witness its workings, so rapid, smooth, and satisfactory is its execution. The "Holt" is now cutting hoops at the rate of 100 feet per minute, and has not begun to reach its limits.

THE safe deposit vault recently completed for the Nassau Bank, corner Beekman and Nassau streets, New York, is said to be the largest steel vault ever constructed. It is made of welded chrome steel iron and franklinite. It is 35 feet long, 22 feet wide and 6 feet high. It rests upon a thick foundation of concrete and granite.

FROM statistics published by the British Iron Association, we larn that 4,241,245 tons of pig iron were produced in England during the half year ending June 30 last, as against 4,249,194 tons in the last half of 1881. Tha stock on June 30 was 1,371,262 tons, compared with 1,736,262 tons at the end of 1881.

THE last spike has been driven on the Columbia River Division of the Oregon Railway & Navigation Co.'s line, and there is now continuous rail communication between Portland, Oregon, and the heart of the Rocky mountain region at the end of the Northern Pacific track, a distance of about 500 miles.

THE Maumee Rolling Mill Co., of Toledo, has been organized, with H. S. Walbridge as president; Ignatius Droeg, general manager; H. S. Worthington, treasurer, and E. H. Van Hoesen, Secretary. Two-thirds of the stock of $500,000 is owned by the Licking Rolling Mill Co., of Covington, Ky.

EDWARD C. POST, Toledo, manufacturer of hydraulic and power elevators, shafting, pulleys, etc., has just added to his tools a new thirty foot lathe. He has just filled an order for 900 feet of shafting with hangers, and a 4,000 pound power elevator for the Western Automatic Screw Company, of Elyria.

THE roof of the casting house of Phœnix Furnace, owned by Brown, Bonnell & Co., at Youngstown, fell in on the night of October 17. No one was injured, and the furnace is running as usual.

THE Niles Fire Brick Co., Niles, have completed their new works near the Thomas Furnace. They are makig a specialty of fire brick and blocks for iron, steel and glass works, out of the Thomas fire clay.

BECKMAN, SR., & Co., of the Northern Ohio Blanket Mills, have their new addition 70x50, three stories, completed, and are manufacturing 200 plush lap robes a day.

THE Gulf, Colorado & Santa Fe Railroad is in course of construction from Galveston, and is expected to reach the city of Santa Fe in eighteen months.

Edison's Company Lighting Up.

The Edison Electric Light Company, which for the last year and a half has been preparing to light up its first district in New York, bounded by Spruce and Wall streets, Nassau street and the East River, turned the current into Drexel & Morgan's offices, at Wall and Broad streets last week, and the light may now be seen there. In summer the advantages of a light which does away with heat and gas odors, and does not vitiate the air as gas does, are not so easily realized as when more light is needed, and the doors and windows are carefully shut. The light is perfectly pure, pleasant to the eye, and so much like gas in color that when covered by a ground-glass globe no one can tell whether it is gas or electricity. It is perfectly steady, and has none of the flickering sometimes due in incandescent lamps to the weakness of the engine which drives the dynamo. The powerful engines at the Edison Station, in Pearl street, run without the slightest jar, for the engine-shaft is connected directly with the dynamo, thus doing away with the belt to which in former experiments could be traced most of the unsteadiness in the light. Whenever the ends of the belt in an ordinary engine pass over the fly-wheel the effect can be seen in any lights supplied from dynamos connected with that engine. This is one reason why the six enormous dynamos for 1,250 lights apiece have each an engine as part of the dynamo. There is now running, in the Pearl street station, one dynamo the current from which is sent to wherever the men are work joining the street mains to the house mains, so that the lights can be tested as the work goes on. At any time after this week houses having their lamps and meters in can use the light. Mr. Edison is at the station every day, highly delighted with the results of his two years' work, and studying out any obstacles which may present themselves.

Plating Iron and Steel with Other Metals.

Mr. Carl V. Reusch, of 93 John street, New York, is now introducing into this country, from Germany, a new method of plating iron and steel with metals and alloys which can be rolled at a red heat, and of plating such metals and alloys with each other. The trouble hitherto experienced in successfully carrying out this operation arises from the fact that the oxidation of the metals during the preliminary process of heating prevents a perfect weld. Partial success in this direction has been attained at different times, but only through an exercise of care which could not be relied upon in regular working, and accordingly iron and steel articles plated in this manner were unreliable and in many cases defective. The new method avoids oxidation, which is the main source of trouble, by the use of a metallic chloride which volatilizes at a red heat, (for instance, chloride of zinc or muriate of ammonia), and aims at a still more perfect union of the two metals through a coat of tinfoil placed between them as a welding metal. A flat bar of iron or steel, treated in this manner and enveloped in the plating metal, is brought to a red heat and drawn to any required dimensions between cold rolls. The plated metal is claimed to stand stamping, hammering, bending and drawing without any injury, and the process is said to be applicable to all metals or alloys that can be drawn or rolled at a red heat or to the plating of the latter with one another. We have been favored with several small samples of steel plated according to this method, and would say that they look very well and show an apparently perfect weld.

Edison's Electric Light.

The manager of the Edison Electric Light Co., says: The most successful part of our work is the system of underground conductors. The mains are laid in lengths of 20 feet, each subjected at the factory to a test of resistance. The theoretical loss of current in our 14 miles of conductors amounts to less than half of one-hundredth of a horse-power, or about 1-7000 of the current needed for one lamp. If the whole of Manhattan Island was supplied with light through conductors as perfect as those we have laid down town, the loss through leakage would not amount to current enough to run one lamp. We are now running 1450 lamps from our station in Pearl street, and have found no trouble, except a purely mechanical one connected with the engines, which has now been overcome. We have no reason to believe that the system will not be the great success that has been hoped.

A Thames Launch Propelled by Electricity.

A correspondent of the London Times, writes: "Having been one of a privileged party of four, the first ever propelled upon the waters of the river thames by the motive power of electricity, I think some of the latest departures in the applications of electric science may be of interest.

"At half-past 3 this afternoon I found myself on board the little vessel Electricity, lying at her mooring off the wharf of the works of the Electric Power Storage Co., at Millwall. Save for the absence of steam and steam machinery the little craft would have been appropriately called a steam launch. She is 26 feet in length and about 5 feet in the beam, drawing about two feet of water and fitted with a 22-inch propeller screw. On board were stored away under the flooring and seats, fore and aft, forty-five mysterious boxes, each a cube of about 10 inches in dimensions. These boxes were nothing else than electric accumulators of the latest type as devised by Messrs. Sellon & Volckmar, being a modification of the well-known Plante accumulator. Fully charged with electricity by wires leading from the dynamos of generators in the works, they were calculated to supply power for six hours at the rate of four-horse power. These storage cells were placed in electrical connection with two Siemens's dynamos of the size known as D 3, furnished with proper reversing gear and regulators, to serve as engines to drive the screw propeller. Either or both of these motors could be 'switched' into circuit at will. After a few minutes' run down the river, and a trial of the powers of the boat to go forward, slacken, or go astern at will, her head was turned citywards, and we sped—I cannot say steamed—silently along the southern shore, running about eight knots an hour against the tide.

ICE MAKING.—The "binary absorption" system of ice-making has of late been attracting much attention. One of the latest discoveries is a new binary liquid composed of glycerine and ammonia, which has remarkably valuable properties. The discovery was made by August J. Rossi and Leonard F. Beckwith. Experiments with the new liquid are going on at the works of the International Ice Machine Co. at Greenpoint, N. Y. The pressure in the machine when in operation is said to be from 35 to 50 pounds, but at rest it is very slight, ranging 0 to 15 pounds per square inch. When we consider that the pressure is such that an ammonia ice machine may run up above 200 pounds per square inch, one of the great advantages of the new liquid will be seen.

A PARIS firm has an invention for the instant formation of steam. Water is pumped between two highly heated plates, between which there is only a capillary space, and is instantly converted into steam, which at once passes into the cylinder as fresh formed steam and is as effective.

VALUES in California have, according to the tax levy, fallen off $51,000,000 since last year's assessment. More than $20,000,000 of this deficiency is charged to San Francisco.

The Mysteries of Soft Coal.

For years no one supposed that a lump of soft coal, dug from its mine or bed in the earth, possessed any other purpose than that of fuel. It was next found that it would afford a gas that was combustible. Chemical analysis proved it to be made of hydrogen. In process of time mechanical and chemical ingenuity devised a mode of manufacturing this gas and applying it to the lighting of buildings and cities on a large scale. In doing this, other products of distillation were developed, until step by step, the following ingredients were extracted from it: An excellent oil to supply lighthouses, equal to the best sperm oil, at lower cost; benzole, a light of ethereal fluid, which evaporates easily, and, combined with vapor or moist air, is used for the purpose of portable gas lamps, so called; naptha, a heavy fluid, useful to dissolve gutta-percha and india-rubber; an excellent oil for lubricating purposes; asphaltum, which is a black, solid substance used in making varnishes, covering roofs, and covering over vaults; paraffine, a white crystalline substance, resembling white wax; which can be made into beautiful wax candles. It melts at a temperature of 110 degrees, and affords an excellent light. All these substances are now made from soft coal.

STRIKES.—"If strikes," says the London Iron Trade Exchange, "could be successful they ought to be so in the United States, but there even more than here they are uniformly unsuccessful. The demand for both capital and labor is regulated by laws as infallible as the laws of nature, which govern the rise and fall of the tides and the phases of the moon. The statistics of supply and demand have proved this beyond the shadow of a doubt, and the natural laws of political economy have not changed any more than the laws of nature. As water finds its level so do wages; they cannot be forced by artificial means to a permanent abnormal height. Just as commerce, after having been unduly inflated during the first three years of the past decade, has since been suffering from the consequent reaction; so wages, after rising enormously during the same period, have likewise found a lower level than that at which the beginning of the prosperous times found them. The new school of political economists may assign the cause of low wages to the greed of employers, but the fact remains the same—that the well-being of the wages-receiving class fluctuates by a stern law over which man has no control with that of the profit-receiving class, the capitalists. In the case of both capitalists and laborers, the lurid prosperity led to improvidence and rashness.

STRENGTH OF PAPER.—One of the most remarkable things about paper is its strength. As an illustration of this a note of the Bank of England twisted into a kind of rope can suspend as much as 329 pounds upon one end of it, and not be injured in the least. There is an article made of paper in the shape of a small kitchen or house truck on wheels, used for wheeling loads around the house. The sides and bottom of this are made of finely compressed paper, and it is capable of bearing a weight of five tons. There are bath-tubs and pots made in the same manner, by compressing the paper made out out of linen fibers, which is painted over with a composition which becomes part of the paper and is fire-proof. The tubes never leak, or may be put on the fire and will not burn. It is almost impossible to break them, as you can beat on them with a hammer and not injure them in the least.

POISONOUS EFFECTS OF METALS.—Some curious results relating to the comparative poisonous effects of different metals have been noted by M. C. Richet. He finds that copper is 600 times more toxic than strontium, notwithstanding that its atomic weight is less. Lithium, the atomic weight of which is but a twentieth of the weight of barium, is yet three times more poisonous. Even in the case of the same chemical family of metals, no relation exists between atomic weight and toxicity. Thus, cadmium (atomic weight 112) is just half as poisonous as zinc, the atomic weight of which is 65. Lithium, with an atomic weight of 17, is seventy times more poisonous than sodium. It may, therefore, be concluded that there is no relation between the chemical function of a body and its toxic power. Potassium and sodium, the properties of which are so similar, differ widely in their poisonous effects, one grain of the former being nearly 250 times more poisonous than one grain of the latter. The limit of toxicity assumed by M. Richet is the maximum quantity of the poison distributed in the liter of water in which a fish can live twenty-four hours.

ELECTRIC STORAGE.—It seems that in December, 1881, Henry Sutton announced to the Royal Society of England that he had devised a storage battery, which consisted of a long strip of lead and another similar strip of sheet copper, separated by a layer of sheet rubber and wound together in a roll. This roll was placed in a glass jar four inches deep and four inches in diameter, and filled with a solution of sulphate of copper —common blue vitrol. The sheets of lead, copper and rubber were perforated to allow the free circulation of the liquid, and all crystals of the blue vitrol excluded from the solution. The copper being made the positive electrode, the solution, which is highly blue, loses its color. When the cell is fully charged the solution is colorless. During the discharge of the storage battery the solution assumes its original azure hue. This change of color forms a beautiful means of telling when the cell is charged; it is a veritable charging gauge. The power of the battery is very great and very constant. It can be made to last for hours, time being dependent upon the quantity of sulphate of copper decomposed.

DIVERSITY OF LEVELS.—The great diversity of our country is shown in the various levels at which our people live: 15,053 live between 7,000 and 8,000 feet above sea level, 24,947 live between 8,000 and 9,000 feet, 26,400 live over 10,000 feet, 26,846 live between 9,000 and 10,000 feet, 4,987 live between 6,000 and 7,000 feet, 128,348 live between 3,000 and 4,000 feet, 166,545 live between 4,000 and 5,000 feet, 271,321 live between 5,000 and 6,000 feet, 694,857 live between 2,000 and 3,000 feet, 1,876,885 live between 1,500 and 2,000 feet, 7,903,811 live between 1,000 and 1,500 feet, 9,152,003 live 100 feet above the level of the sea, and 10,775,250 live between 100 and 500 feet, and 19,025,617 live between 500 and 1,000 feet above the level of the sea. The average height of all is 700 feet above sea level. Nearly half a million of our people live a mile high and over.

MACHINE PATTERNS.—Mr. J. Whitehead, No. 8 Champlain street, Cleveland, is furnishing designs and drawings for all classes of machine patterns. Mr. Whitehead has had 25 years' experience in this line, and was for five years employed as foreman in the Globe Iron Works. He combines in an eminent degree scientific attainments with a knowledge of practical mechanics.

IT is claimed that the aggregate wealth of the State of New York is $7,000,000,000. This is about a seventh of the wealth of the whole country.

NEW FUEL.—The Northern Pacific is testing a new description of fuel. It consists of pulverized lignite mixed with soluble glass. The process has been in use in Wales since 1873. The material is compressed under a pres-

sure of one ton to the square inch. It is formed into blocks of great density, resisting the action of water. They do not fall to pieces in the fire or clinker and increase the ash. It is claimed the fuel has a greater evaporative power than an equal weight of coal. The density is greater than that of coal. The cost of preparation is 50 cents per ton. On some Eastern roads companies are now using the fine dust itself, hitherto considered worthless.

Uses of Wire Cloth.

Wire cloth, such as is used by paper mills and for sieves, corn-poppers and hundreds of other purposes, is woven in the same manner as cotton or woolen goods, save that a large portion of the work is done on hand looms, samples of which can be seen in operation any day in factories on Cornhill, in Boston, or near the Cottage Farm station on the Boston & Albany railroad. Wire cloth for window screens, requiring less care in its manufacture, is woven on power looms, and a single concern at Clinton, Mass., makes 15,000,000 square feet feet of this cloth per annum. The total amount of wire cloth woven by machinery for window-screens alone in the United States is put down at 30,000,000 square feet per annum. For this purpose light and cheap iron wire is used. For paper mills, cloth made of fine and strong brass wire is employed. There is no other process for making paper except by running the pulp over brass wire-cloth, and this cloth has to be renewed every few months. A single firm of paper manufacturers in this city is put to an annual expenditure of $2,000 to replenish the wire cloth in its mills. As there are about 350 paper mills in the United States, it will be seen that the quantity of wire cloth required by them all is considerable. Wire cloth is sold by the square foot and is graded according to the number of wires in an inch. Cloth which containes two meshes per linear inch or four per square inch is designated as No. 2. That which contains 100 meshes per linear inch or 10,000 per square inch, is designated as No. 100. Cloth as fine as No. 120 is sometimes made, but it is always of brass or copper. No iron wire is used in any number above 40. The wire cloth used in window screens is No. 13, and that employed in flour sieves is principally No. 20. The brass cloth used by paper mills is mostly No. 60. The price of No. 2 iron wire cloth is 10 cents per square foot; that of No. 2 brass is 40c.; and No. 2 copper is 45c. No. 100 brass cloth sells at $1.25 in small lots at retail, and at about $1.00 in large lots at wholesale. These prices will serve as fair samples of the value of wire cloth in general.—*Cotton, Wool and Iron.*

MARKETS.

Office of TRADE REVIEW AND WESTERN MACHINIST.

FRIDAY EVENING, November 10.

FINANCIAL.

The applications for discount in our local money market have not been very large, and an easy tone prevails. Rates remain steady at 7@8 per cent in bank and outside for prime paper. On prime collaterals money is obtained at 6 per cent. on specific time, and 5 per cent. on call. The market for Eastern exchange is steady and firm at par buying and 1-20 per cent. premium selling. Sterling exchange has been a little easier but closes steady with prime local bankers' three days' sight selling at 486. and sixty-day bills at 481¼. Dealers buy commercial bills at 479½ per £. There has been a moderate trade in local securities and a firm tone prevails.

IRON.

There has been for some time a weak market in iron except for leading brands. A large consumption is going on, but productive power has also been increased. Our furnace men, though not inclined to accept absolutely outside quotations, have considerably lowered their views. Holders generally are disposed to make concessions. There is but a limited amount of Scotch Pig in stock. We quote: Eglinton, $23.50@24; Carnbroe and Glengarnock, $25.50@26; Coltness, $28; Gartsherrie, $26, and Langloan, $26.75@27. Steel rails at mill are $45@46. Old rails are only being disposed of in small parcels. Business in wrought scrap is dull. Trade in Car iron is fair. The mills have orders enough to keep them busy and refuse to make lower prices. Buyers however think that prices should be lower, and if trade slacks up at the mills they probably will be. We quote $2.45@2.50 for bar. Horse shoes are scarce and in good demand at $4.75 per keg, and horse nails are meeting with a good trade. Norway and Swedish are in fair demand at $4 for bars and $5 for shapes. There is an active business going on in plate iron, We quote tank at 3¼c; refined at 3¾c; shell at 4½c; flange at 5½c. Tubes are stronger at 57½c. per cent off from list price. Pipe firm at 55@57½ per cent. off to dealers. Jobbing prices are 55 per cent. off for large sized lots, and 52½ per cent. off for small lots. Enameled pipe is selling to the trade at 40 per cent. off. In sheet iron trade is active with no change of prices.

CINCINNATI—Reported by E. L. Harper & Co.

The peculiarity of the business of the week has been that irons of all classes have been more or less active. Car Wheel has been moved in quantities uuusual in late history, and soft silvery grades in large quantities. Some new coke furnaces (going into blast about the first of the year) to secure orders have made sales at prices under the market and temporarily demoralized it, but having secured ample orders for their early output, will probably not have occasion to disturb the market with further unnecessary cutting. Strong Neutral Coke irons in mill and foundry grades are comparatively scarce and prices have hardened during the week Market closes firm We quote as follows for four months: Foundry.—Hanging Rock Charcoal, No. 1, $25.75 @ 26.50; Strong Neutral Coke, No. 1, $23.00@23.50; American Scotch, No. 1, $21.00@22.00. Grey Forge.—Neutral Coke, $21.50@22.00; Cold Short, $20@20.50 Car Wheel and Malleable —Hanging Rock, C.B., $33.00@35.00; Hanging Rock, Warm Blast, $27@28 Lake Superior 1 to 2 $27@28; Lake Superior, 3 to 6, $28@30; Southern Car Wheel, $32@33.

COPPER.

The market is quiet at 18¼c. for Lake Ingots. Anchor brand and Baltimore are 17¼@17⅝ London cables: Best Selected £76, and Chili Bars £70. 10.

LEAD.

Lead is weak, and users look for further decline, as low as 4¼c., and we nominally quote it at 4⅞c. with few transactions. Western lead is offering much more freely. St. Louis is 4½c. for Hard and $4.70 for Soft nominally.

TIN AND TIN PLATES.

A large business has been doing in tin. We quote large lines at 23¾ and jobbing lots 23¾. The stock at New York and Boston is estimated at 1,800 tons. For tin plates the market is quiet. We quote per box: Charcoal Bright, $6@6.37; ditto Ternes, $5.25@5.45; Coke Tin, $5@5.30, and ditto Ternes, $5@5.12.

SPELTER AND ZINC.

Market for Spelter quiet at 5¼c. for Domestic, and 5¼c.@5⅝c. Silesian. Bertha Refined, under heavy contracts, has been raised to 8¼c. We quote Bergenport, 9¼c. Domestic sheet Zinc sells at 6¾c.@6⅞c., which is below cost of importation. A fair business is doing at steady demand.

ANTIMONY.

Cookson sells still at 13c.@13¾c., while Hallett is bringing 10⅞c.@11¼c. In London there is no change.

HARDWARE.

There is a fair demand for shelf and heavy hardware. Quotations in all lines continue firm. Stocks of nails are light, and the tone of the market is strong; we continue to quote 10d. @ 60d. $4 per keg net. The Wire Cloth Manufacturers' Association has been formed at Rochester, N. Y., which adopted, and will shortly issue, uniform lists for all grades and meshes of Iron, Brass and Copper Wire cloth, with a scale of discounts to apply to the same.

LUMBER.

There has been a noticeable improvement in the distributive demand for lumber the present week, and prices are somewhat more firm. The sales throughout the season compare favorably with those of last year, and a continued good current demand from the country trade is relied on. There are considerable requirements being met for spruce and hemlock. The stock of shingles is being rapidly reduced Altogether the outlook is considered encouraging. The business in hardwoods has been on the average. Agricultural implement makers are buying only for present requirements, postponing heavy purchases till spring. Red oak and cherry are in fair demand for finishing.

WOOL.

The wool market is moderately active, with buyers rather cautious, but holders fairly firm in their views on most classes of wool. In the Eastern markets, sales of domestic washed fleeces, Ohio XX and above have been disposed of principally at 43½@44c. Sales of a quantity of No. 1 Ohio were made at from 44@46c.

LUMBER.

PLANK, MIXED WIDTHS.
2 inch, 12, 14 and 16 feet, together.

A 1 and 2 uppers	$50
A 3	40
B	32
C	20
D	14
E	12

1¼ and 1½ inch.

A 1 and 2 uppers	$48
A 3	40
B select	32
C	20
D	15
E	13

BOARDS.
One Inch, mixed widths.

A 1 and 2 uppers	$44
A 3	36
B select	30
C	19
D	14
E	12

STOCK BOARDS.
12 Inches wide.

A 1 and 2 uppers	$45
A 3	38
B	32
C	21
D	16
E	13

STRIPS.
6 Inches wide.

A 1, 2, and 3	$42
B	32
C	22
D	16
E	12
Norway Fencing Strips	17
Norway Flooring Strips	25

WORKED LUMBER
FLOORING.

Flooring—A 3	$42
B	35
C	24
D	20
Norway Flooring—A 3	28
C	22
D	18
Matched Drop Siding, 6 inches—A 3	42
B	38
C	24
D	20

Beaded Ceiling $2 higher than Flooring.

One half inch Bevel Siding—A 1 and 2	24
A 3	20
B	18
Ash Flooring—A 1 and 2	40

BILL STUFF.

Small, joists, 12, 14 and 16 feet	$14
Timber, longer than 20 feet and over less than length.	$4 00@$6 00
Cedar Posts, large	30 00
" " medium	25 00
" " small	$15 to 20 00

SHINGLES, LATH AND MILL WORK

Shingles XXX	$ 4 25
Clear Butts	3 25
Lath	2 75@3 00

Surfacing, one side, adds $1.25; two sides $1.50
Matching, flooring and drop sidings, $2.25.

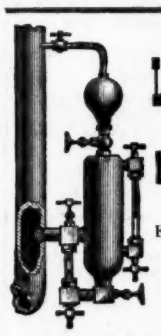
LAKE FREIGHTS.

COAL.

Buffalo to Chicago	$.62½@.65
Toledo to Chicago	1.00
Cleveland to Chicago	70@75
Erie to Chicago	70@75
Oswego to Chicago	1.50
Fairhaven to Chicago	1.30
Buffalo to Millwaukee	70@75
Cleveland to "	70@75
Erie to Milwaukee	75
Buffalo to Racine	80
Buffalo to Kenosha	85

IRON ORE.

Marquette to Lake Erie ports	1.25
Escanaba to Lake Erie ports	90@95
Escanaba to Chicago	90@95
Marquette to Chicago	1.15@1.20



The Detroit
LUBRICATOR COM'Y'S
Sight Feed
LUBRICATOR
Cups.

For oiling valves and cylinders of steam engines, by the only perfect method, THROUGH THE STEAM PIPE. The oil passes IN SIGHT, drop by drop, into the column of steam where it vaporizes, thus becoming a STEAM LUBRICANT, oiling perfectly every part reached by the steam. Any CLEAN OIL, black or white, light or heavy, may be used. Saves from 50 to 90 per cent. in oil and wear of machinery, thus paying for itself several times a year. A cup will be sent to responsible parties on twenty day's trial if desired. In ordering give diameter of cylinder.

NOTICE.

The first Lubricators ever made, showing the oil passing drop by drop through a transparent water chamber, were devised by us, and the same are fully embraced by many Letters Patent owned and controlled by us, which have been sustained in several hotly contested legal contests. Our customers, therefore, need have NO FEARS IN THEIR PURCHASE AND USE. We are the sole owners of the "Sight Feed" feature as claimed by us, and we shall hold purchasers and users responsible who are encroaching upon our rights by the unfawful use of our device. Address,

DETROIT LUBRICATOR CO.
Office, 98 Griswold Street, Detroit, Mich.

Note—In our recent suit against the American Lubricator Co., of Detroit, before Justice Stanley Matthews, of the U. S. Supreme Court, involving their "sight-feed" feature, a decree was rendered in our favor August 20, 1881. (Mention this paper)

☞ WM. BINGHAM Sole Agent for this territory.

COATES'
"Independent Lock Lever"

HAY AND GRAIN RAKE.

Patented August, 1867, January, 1875, June, 1875, and November, 1876. 60,000 now in use. Light touch of lever and driver's weight dumps it. Best self-dump in market. Twenty steel teeth. No complicated ratchet wheels, friction bands or other horse machinery needed to operate it. A small boy rakes easily twenty acres per day with the Coates' Lock Lever. Send for circulars.

A. W. COATES & CO.
Alliance, Ohio.

W. S. IDE, President. R. T. CLARKE, Manager.

THE
VULCAN IRON WORKS CO.,
Builders of
IMPROVED
Forging Tools,
COLUMBUS, OHIO.

SPECIALTIES:
STEAM DROP HAMMERS,
STEAM HAMMERS,
POWER PUNCHES AND SHEARS AND POWER HAMMERS.

☞ CIRCULARS, PHOTOGRAPHS, AND PRICES FURNISHED ON APPLICATION.

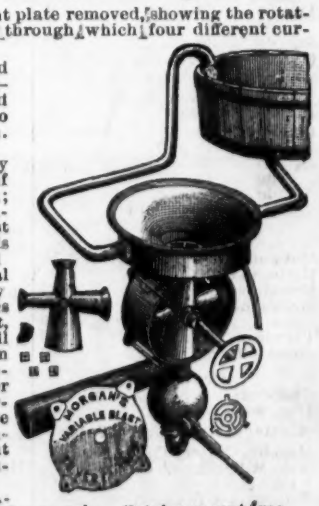
The Vulcan Iron Works Company.

AIR FURNACE PROCESS.

MICHIGAN MALLEABLE IRON COMPANY:
Manufacturers of
REFINED
MALLEABLE IRON CASTINGS,
Detroit, Mich.

THE MORGAN
Variable Blast Water Tuyere Iron.

With the front plate removed, showing the rotating air tubes through which four different currents of air may be passed thereby making any sized fire from two to eighteen in. diameter.



I. actually saves one-half of the coal; makes an intense heat just where it is needed, and burns no coal unnecessarily Always gives a centre blast, and cleans all the dirt from the fire. Supplies hot water

We also furnish a Tuyere on same principle without Water Attachment. All goods guaranteed to please or no sale. Catalogue sent free. Address,

A. W. MORGAN & CO.
52 Vance Block, Indianapolis, Ind.

NERVOUS weakening disorders, night emissions and vital drain arising from Indiscretion. Send two 2c. stamps for "Treatise and List of Questions" Address DR. CLEGG, Cleveland, O.

Cleveland Wholesale Prices.

HARDWARE.

Adzes.

Carpenter's.....per doz $18 40
Ship..... " " 18 75
Heavy railroad.... " " 19 50

Axes.

Hunt's.....₰ doz $ 9 50
Lippincott's Crown.₰ doz 9 00
Cut More.₰ doz 9 00
Peck's Double Bit.₰ doz 22 00
"Champion Blade.₰ doz 11 00

Anvils.

Eagle, Amer...per lb. 10c dis 20
Wright's.....10¾c@11c
Armitage's Mouse Hole.9⅛@9¾c
Trenton.....10¾c
Wilkinson's.....10¾c

Anvil Vise and Drill.

Millers' Falls Co. $28.....dis 20
Cheney Anvil and Vise..dis 25&2

Vises.

Solid Box, list of July 1, '79, dis 35
Solid "Crown" (A. H. Hildick).....40 to 100 lb. 15c net
Solid, Peter Wright's.....15¾
Solid, Wilkinson's.....13¾
Parallel, Parker's.....dis .0
Saw Filers. Hopkins'₰ doz $17.50, dis 10
Reading.....dis 45&10
Lowell Hand Vises.....dis 20
Richardson's Vise and Anvil.....dis 25

Augurs and Bits.

C S cut augers.....dis 40&10
do do do bits.....40&10
D C gimlet do Ives....dis 50
Snells bits.....dis 40
Russell Jennings' augers dis 16⅔ &10&10
Cook's pat augur.....40&10

Animal Pokes.

Beres, per doz.....4 00
Eagle, per doz.....5 00

Apple Parers.

Domestic & Reading₰ doz.$7 50
Turn Table.....5 00

Bolts.

Machine.....dis 60
Bolt ends.....dis 60
Plow.....dis 50
Plow, R. B. & W.....dis 40
Cast Iron Barrel Shutter, etc.....dis 50&10
Cast Iron Chain (Sargent' list).....dis 60&10
Ives' Pat. Door Bolts...dis 50
Wrought Barrel.....dis 55&10
Wrought Square.....dis 55&10
Wr'g't Shut'r, all iron, Stanley's list.....dis 50&10
Tire, R. B. & W., new list.....dis 70&10
Stove, American Screw Co.'s.....dis 40
Bolt Ends.....dis 60

Bellows.

Dis

Blacksmith's com new list, 45₰ct
Moulder's new list, dis 25₰ cent
Hand, new list, 25 per cent

Butts.

Dis

Wrought brass.....65&10
Cast, loose joint.....55
Pin, loose.....50
Wrought, fast joint narrow.....45
Wrought fast joint broad.....45
Wrought loose joint broad.....55
Wrought table and back flaps.....45
Loose joint, without acorns.....55
Ten per cent. extra dis for cash.

Cleveland Stamped Elbows

Genuine Russia Iron

4 inch per doz.....4 50
4¼ do do.....5 50
5 do do.....7 50
5½ do do.....8 50
do do.....9 50
do do.....11 00

Planished American Russia Iron

inch, per doz.....4 00
4¼ do do.....5 00
5 do do.....6 50
5½ do do.....7 50
6 do do.....8 50
do do.....9 50

Charcoal Iron

4 inch, per doz.....2 00
4¼ do do.....2 50
5 do do.....3 50
5½ do do.....4 00
do do.....4 50
do do.....5 50

25 per cent

Chisels.

Hot and cold cutting.....₰ lb 30
Railroad track.....30
Machinists.....30
Mallet head.....50
Tape.....50
Packing.....50
Stone cutters.....50

Crowbars.

Cast steel.....₰ lb 8¼
Iron, steel points.....6¼c

Cutlery, Pocket and Table.

Meriden Cutlery Co., table..net
Am. Miller Bros.' Cutlery Co.....dis 25
Humason & Beckley, pocket 33⅓
Naugatuck Cutlery Co...list net
Aaron Berkenshaw's pocket dis 25

Coopers' Tools.

Bradley's.....dis14@2
Barton's.....dis 20

Chains.

Coil by cask.....

3-16	¼	5-16	⅜	7-16	½
10⅝	9	8	7	6⅛	6¼

Drills and Drill Stocks.

Blacksmiths', each...$2.50 dis 10
Blacksmiths', self-feeding, each 7.50 dis 20
Breast, P. S. & W.....dis 20&10

Drawing Knives.

Witherby's.....dis 65@10
Nobles Mfgr. Co.....15
Adjustable handle.....20

Emery and Emery Paper.

Regular Numbers.....₰ lb 6c
Flour and F. F.....₰ lb 4c
B. & A. Emery Paper..dis 30&5

Enameled and Tinned Ware.

Kettles.....dis 50
Sauce Pans.....dis 25
Tinned Sauce Pans.....dis 50

Files.

Auburn...$5 to £. dis 35 pr cent
E. M. Boynton's, new list..dis 25
J. & Riley Carr.....4.50 to £.
Johnson & Bro.....dis 30
Butcher's.....4.50 to £.
Walter Spencer & Co.'s "Diamond".....4.50 to £.
Fisher's.....4.75 to £.
Moss & Gamble.....4.50 to £.
H. Disston & Sons (new list).....dis 40 per cent
Heller Bros.' Horse Rasps dis 25
Nicholson.....dis 40
New American.....dis 40
Union File Co.....dis 40

Grindstones.

Ohio.....1¼@1⅝ ₰lb
Nova Scotia.....1¼@1¼ ₰lb

Hammers.

Maydole's.....dis 15
Cheney's.....dis 25
Hartford Hammer Co.....dis 20
Humason & Beckley.....dis 50
Verree.....dis 5
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50 and $1.75, dis 25&10
Nelson Tool Works...dis 40&10
Warner & Noble's.....dis 5
Kip's.....dis 15
Yerkes & Plumb.....dis 15
Wilkinson's Smiths' 11¼c ₰ lbnet

Hatchets.

Yerkes & Plumb:--Shingling, Nos. 1, 2, 3,
₰ doz $7 50, $8 00, $8 50, dis 25
Claw, Nos. 1, 2, 3,
₰ doz $8 25, $8 75, $9 25, dis 25
Lathing, Nos. 1, 2, 3,
₰ doz $7 50, $8 00, $8 50, dis 25

Nails.

10 to 60d.....$4 00
8 and 9d.....25
6 and 7d.....50
4 and 5d.....75
3d.....1 50
2d.....2 75
3d fine.....3 00
2d fine.....3 75
⅞ inch.....3 00
4d barrel.....1 00
1¼ inch barrel nails.....1 50
1½ do do do.....1 75
1 do do do.....2 50
⅞ do do do.....3 00
Cut spikes, all sizes.....25
Clinch nails, all sizes.....1 75
Casing and box nails 75 cts advance
Finishing nails, $1 25 do
Tobacco nails, 50 cts do

Nuts and Washers

Nuts, square.....7c off list.
Nuts, hexagon.....6c. off list.
Washers.....6c off list.

Picks.

Railroad, 4 to 5 lbs...doz $7 75
5 to 6 lbs.... 7 75
to 7 lbs.... 8 50
7 to 8 lbs.... 9 50
Railroad Tamping Pick.... 7 to 8 lbs..doz 13 50
Mill Picks per lb.....75c

Rivets.

Iron.....dis 40
Tinned.....dis 40
Copper.....dis 33⅓

Squares.

Dis

Steel or iron, case lots.....50
Try squares and T bevels.....40

Spikes—WROUGHT

All lengths by ¼ inch.....4¼c
do do do 5-16.....3¼
do do do ⅜, 7-16 & ½ in 3¼

Shovels and Spades.

Ames' new list, July 1, 1881.....dis 15
Old Colony.....dis 15
Remington's (Lowman's Patent).....dis 30
Rowland's.....dis 40 and 10
Griffiths.....dis 40&10

Saw Sets.

Boynton's patent X Cut, per doz $12; Hand Saw, per doz $10.....dis 20
Stillman's Genuine, per doz $3 50 and $5 50.....dis 20
Stillman's Imitation, per doz $3 25.....dis 20&10
Common Lever, per doz $2 dis 30&10
Leach's No. 0 $8; No. 1 $15; dis 15
Hammer, Hotchkiss $5 50, dis 10
" Bemis & Call Co.'s new patent.....dis 40&5
Bemis & Call Co.'s Lever and Spring Hammer..dis 30&5
Bemis & Call Co.'s Plate..dis 10
" " Cross-cut dis 12½
Aiken's Genuine...$13, dis 50&10
" Imitation.....$7, dis 50
Hart's Patent Lever.....dis 20
Disston's Circular.....dis 40

Sad Irons.

From 4 to 10 lbs....per lb 3¾ net
Self-Heating.....₰ doz $9 net
" Tailors.₰ doz $18 net
Gleason's Shield and Toilet.....dis 25
Mrs. Pott's Irons, double pointed.....dis 35
Mrs. Pott's Irons, square back.....dis 35
Enterprise Star Irons.....dis 40
Combined Fluter and Sad Iron.....₰ doz $15, dis 15

Scales.

Hatch, Counter, No. 171 ₰ doz. $42, dis 37½&10
Union Platform.....$6, dis 45
Fairbanks'.....dis 20
Buffalo Scale Co.....dis 20&5
Forsyth Scale Co.....dis 25
Howe's.....dis 20&10
Chatillon's Eureka.....dis 25
Family U versal.....dis 50
Scale Beams.....dis 33⅓&10

Bag Holders.

Sprengle's Pat, $18.00 per doz 40 per cent. dis.

Planes.

Ohio Tool Co.....dis 25
Sciota.....dis 30
Bailey's Pat. Adjstble..dis 20@25

Rules.

Stanley.....dis 66⅔ and 10

Sash Locks. Discount.

Payson Mnfg. Co. "Perfect"..42
Simmons' Sash Supporters...20

Hinges.

Champion double acting spring hinges.....dis. 30
Screw & Strap 8@12 in.....$6. net
Gravity Locking Blind Hinges, Sargeant & Co. 70&10

Screws. Dis

Flat head iron or steel per cent dis.....30
Flat head brass.....30
Round head iron or steel..25
Round head brass.....20
Brass and Silver capped..40
Japanned, list of Plain Screws.....20
Coach, patent Gimlet point, list per 100.....60
Lag, taper points.....60
Bed.....10
Machine, flat head, iron.....55
round head, iron.....50
Bench, iron.....55&10
wood, beech, per doz $3.....10
wood, hickory.....20&10

Valves. Dis.

Jenkins' Patent Gate Valves..35
" " Globe " ..40
" Standard Packing " ..20

Wrenches.

Coe's genuine.....40 & 10
Coe's imitation wrought bar..60
Mechanics' 60 and 10

Wire.

Brass and Copper.....dis 20
Bright & annealed, Nos. 0 @ 18 dis 50@52½
" " Nos. 19 @ 26 dis 60
" Nos. 27 @ 36 dis 65
Coppered.....Nos. 0 @ 18, dis 45
Galvanized, Nos. 0 @ 18, market list, dis 40
Tinned, Nos. 0 @ 18,.....dis 40@45
Cast steel.....dis 40
Tinned Broom Wire, Nos. 18 @ 25.....dis 55
Annealed Fence, Nos. 8 and 9.....dis 55@52½
Annealed Grape, Nos. 10 to 14.....dis 52½
Galvanized Telegraph, Nos. 7 to 9.....₰ lb 7¼c
Galvanized Telegraph, Nos. 10 to 11.....₰ lb 8¼c
Galvanized Telegraph, No 12.....₰ lb 10¼c
Fence staples.....₰ lb 5½@5¾c
Fence Staples, galvanized, ₰ lb 7@7¼c
Stubs Steel Wire.....$7 00 to £
Barb Wire, painted.....8¼c
Barb Wire, galvanized.....9¼c
Crucible Steel Ropes from ⅜ in. at 9c to 1¼ in. at.....52c
Best Selected Iron Ropes from 3-16 in. at 3c. to 1¼ in. at.....33c

Boiler Plates.

("Gaylord"--Standard Quality.)
C. No. 1.....4 50
C H. No. 1 Shell.....4 75
C. H. No. 1, 50,000.....5 25
C. H. No. 1, 55,000.....5 75
C. H. No. 1 Flange.....6 50
Firebox.....
T. S., 60,000.....(as per)..6 50
T. S., 65,000.....(act of)..
Homo. Steel, 70,000 (of Cong).7 50
Heads, ½c ₰ lb. extra.
N.B.—Eastern brands of boiler plate at from 2-10 to 3-10c ₰ lb less than above prices.

Sheet and Tank Rivets. "Norway."

All sizes.....dis. 15

Boiler Rivets—" Albany."

⅛, ¾, 11-16, and ¾ in. diam.5 50

Boiler Makers' Tools.

Doty's Power Shears....net list
" Hand Lever Shears.net list
" Power Punch.....net list
" Hand Punch.....net list
Steel Screw Punch.....net list
Iron Screw Punch.....net list
Boiler Plate Rolls.....net list
Buffalo Forges & Blowers dis 20
Watson's " " net list
Spring Tube Expander....dis 15
Roller Tube Expander..net list
National Tube Cleaner...dis 20
Wire Flue Brushes.....net list
Anvils—"Peter Wright" 12½₰lb
Solid Box Vises.....net list

Nuts, Bolts, etc.

Square & Hex. Nuts....7 off list
Washers.....list
Machine Bolts.....dis 60
Bolt Ends.....dis 60
Boiler Patch Bolts.....net list

Boiler Tubes.

"National" Standard Gauge 1 inch to 10 inch.....dis 37½
"National" Standard Gauge 11 inch to 15 inch.....dis 25
"National" Special Locomotive Tubes.....net list

IRON AND STEEL.

Flat Bar.

1¼ to 4 by ⅜ to 1 inch..... 2 50
4¼ to 6 by ⅜ to 1 inch..... 2 60
1¾ to 6 by 1¼ to 1¾ inch.... 2 90
1¼ & 1¾ by ⅜ to ¾..... 2 60
1 & 1¼ by ⅜ to ¾..... 2 70
⅝ ¾ and ⅞ by ⅜ to ¾..... 2 90

Round.

1 to 1¾ inch..... 2 50
2 to 2¾..... 2 70
2¾ to 3¼..... 3 00
3¼ to 4..... 3 50
4¼ to 4½..... 4 00
4¾ to 5..... 4 20

Square.

1 to 1¾ inch..... 2 50
2 to 2¾..... 2 70
2¾ to 3¼..... 3 00
3¼ to 4..... 3 50
¾ to ⅞..... 2 60

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch. 2 70
1 to 1¾ by ¼ and 5-16 do 2 80
¾ to ⅞ by ¼ and 5-16 do 3 00
⅝ to ¾ by ¼ and 5-16 do 3 50

Half Oval and Half Round.

Wagon box iron ¾ and ⅞.. 4 00
1-10c per lb extra will be charged for cutting to specified lengths

Light Band.

1¼ to 6 by ⅛ to 3-16..... 3 00

Hoops.

1¼ to 2, Nos 16 to 18..... 3 40
1¼ to 4 do 13 to 15..... 3 30
1-10 extra for each gauge lighter

Sheet Iron.

No 22 to 24..... 4 50
No 25 to 26..... 4 70
No 27..... 4 90
No 28..... 5 30

English Steel.

Best cast.....₰ lb 15½c
Extra cast.....16½c
Round machinery, cast.....10c
Swaged, cast.....18c
Best double shear.....15½c
Blister, 1st quality.....13c
Refined tool steel.....16½c
Spring calking.....7¼@7½c
German steel, best.....11c
2d quality.....10c
3d quality.....9c
Sheet cast steel, 1st quality.....15½c
2d quality.....14½c
3d quality.....12½c

American Steel.

Best brands of refined cast steel, ¾ to 2 inches....12c
Crucible cast.....7c
Open-hearth ditto.....4½c
Hammer cast steel.....9c
Spring cast steel.....7½c
Bessemer and open-hearth spring.....5c
Ditto plow.....4½c
Steel boiler plate.....6½@7c
Bessemer machinery...5 @6c
Spring and calking.....7¼@7½c
Tire.....5
Sleigh shoe.....5

Bessemer Steel Tire.

¾ to 1 by 3-32.....4½ ₰ lb
¾ to 1 by ⅛ to 5-32.....4½ ₰ lb
¾ to 1 by 3-16 to ¾.....4½ ₰ lb

Miscellaneous Cast Steel.

Auger and auger bit.....1
Axle steel for wagons.....7
Frog points and plates.....8
Frog size bars.....8½
Pick, hammered.....10
Mattock, beveled.....9
Table cutlery.....7½
Trap spring steel.....10
Pike and cant hook.....9
Coal and granite.....8½

TINNER'S STOCK.

Tin.

Banca,.....per lb. 26c
Straits....." 26c
English....." 27c
Bar....." 27c

Tin Plate,

IC 12x12 charcoal.....$ 6 50
IC 14x20 do.....6 25@6 50
IX 14x20 do..... 8 25
DC 12½x17 do..... 6 00
DX 12½x17 do..... 8 00
DXX, 12½x17 do..... 10 00
DXXX, 12½x17 do..... 12 00
IC, 20x28 do..... 14 50
IX, 20x28 do..... 15 50
IC, 14x20, Best Roof..... 6 00
IX, 14x20, do..... 8 00
IC, 20x28 do..... 13 00
IX, 20x28 do..... 14 50
IC, 10x14 Best Coke..... 5 75

Solder.

Half and Half, in bars.....15½
No. 1 do.....14½
Spelter Solder.....25

Pat Planished Sheet Iron.

[A].....per lb 10½c
[B].....9½c

Nos	10 to 14	15 to 20	21 to 24 & 26
Com	3-60	3-80	4-00 4-20
Char	5-60	5-60	6-00 6-20

Sheets over 28 in. wide ¼c extra

Zinc.

Sheet, cask.....8c
Sheet, open.....8@ 8½

Inners' Tools & Machin

Machines (P. S. & W.) list add 20
Tools (P. S. & W.).....add 6

Plumbers', Steam and Gas Fitters' Supplies.

Wrought Iron Pipe.....dis 60.
Steam Brass Goods.....dis 45
Water " " .....dis 40
Enameled Pipe.....di 65
Artesian Well Casing....net list
Hydraulic Tubes.....net list
Malleable Iron Fittings..net list
Cast Iron Fittings.....dis. 45
Globe Valves.....dis. 35
Angle Valves.....dis. 35
Check Valves.....dis. 45
Safety Valves.....dis. 35
Ludlow Gate Valves.....dis. 20
Ball Gauge Cocks (net per dozen).....$15
Compression Gauge Cocks dis. 35
Montg'ry Gauge Cocks...dis. 35
Register Gauge Cocks (net per piece).....$1 00
Cylinder Cocks.....dis. 30
Air Cocks (net per dozen)...$2 75
Oil Cups.....dis. 30
Steam Gauges.....dis. 40
Water Gauges.....dis. 40
Scotch Glass Tubes.....dis. 50
Steam Whistles.....dis. 45
Pipe Tools.....special
Globe, Angle and Check Valves (Star's regrinding).....dis. 25
Duplex Injectors.....net. 20
Soil Pipe & Fittings.....dis. 20
Sinks.....dis. 25
Bath tubs &c.....dis. 20

Babbitt Metal.

Babbit Metal, No. 4.....8c
Babbot Metal, A No. 1.....12c
Babbit Metal, J. B.....85c
Babbit Metal, genuine.....35c

LEAD.

American,₰ lb.....5c
Bar,₰ lb 6½c dis 10 per ct
Pipe,₰ lb 7½c dis 10 per ct
Sheet,₰ lb..8c dis 10 per ct
Tin-lined pipe₰ lb 15c dis 10 pr ct
Shot Drop 7c; Buck.....7c
Chilled Shot.....8c

COPPER.

Lake Ingot.....18¼@18½c
Baltimore.....17¾@17¾c
Arizona.....17¾@17¾c
Sheathing Braziers Copper, Bolts, &c.
Brazier's Copper, ordinary sizes, 16 oz. per sq. foot, and over per lb.....30c
Brazier's Copper, ordinary sizes, under 16 oz. and over 12 oz. per sq. foot, per lb. 32c
Brazier's Copper, 10 oz and 12 oz per sq ft. per lb. 34c
Brazier's Copper lighter than 10 oz per sq ft...per lb. 36c
Circles less than 84 inches in diameter.....per lb. 33c
Circles 84 inches in diameter and over.....per lb. 30c
Segment and Pattern sheets per lb. 33c
Locomotive Fire Box sheets per lb. 30c
Sheathing Copper, over 12 oz per sq. ft.....per lb. 28c
Bolt Copper.....per lb. 30c
Copper Bottoms..per lb. 31@32c
No copper is Sheathing except 14x10 inches, and not to exceed 34 oz. to the sq. ft.

Tinning.

14x18.....per sheet 6c
All other size sheets, 2½c per square foot For tinning both sides, double the above amount.

SCRAP IRON AND OLD METAL

DEALER'S SELLING PRICES. Net Tons.

No. 1 wrought scrap.....$24
Sheet and hoop " .....10@11
Cast scrap, (No. 1 heavy).....19
Cast Scrap (Stove Plate).....12

OLD METALS.

Old copper per lb.....15c
No. 1 H. Brass per lb.....14
Heavy yellow Brass do.....12
Light Brass per lb.....8
Scrap Zinc per lb.....3½
Tea Lead per lb.....4
Heavy Lead per lb.....3

PIPE, WROUGHT.

Standard Wrought Iron Lap Welded Steam and Gas

Inside Diameter. Inches.	Plain, Price Per Foot.	Galvan. or Enameled Per Foot.	Outside Diameter Inches.	Weight Per Foot.
⅛	08		.40	.24
¼	08	$0 11	.54	.42
⅜	09	12	.67	.56
½	11	15	.84	.85
¾	13½	19	1.05	1.13
1	19	28	1.31	1.67
1¼	27	40	1.66	2.26
1½	33	47	1.90	2.69
2	46	64	2.37	3.66
2½	75	1 00	2.87	5.77
3	95	1 30	3.50	7.55
3½	1 25	1 70	4 00	9.05
4	1 50	2 05	4.50	10.73
4½	1 75	2 40	5.00	12.49
5	2 25	3 00	5.56	14.56
6	2 75	4 00	6.62	18.76
7	3 75	...	7.62	23.00
8	4 75	....	8.62	28.00
9	6 50	....	9.68	34 40
10	8 00	....	10.75	40.64
12	12 00	....		54.65

Discount, 62½ per cent; galvanized, 62½ per cent.

BRASS.

Cash prices for Roll and Shee Brass. For less quantity tha 100 lbs. add 3c per lb.

High Brass.

All Nos not thinner than No. 28, wider than 2 in. not wider than 14 inch.....30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in. inclusive.....35c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in. inclusive.....38c
¼c per lb. advance on each No. above Nos. 28 to 38, inclusive.
All Brass thinner than No. 8 is Platers' Brass at.....53c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 inches, in width wider than 2 inches.37c

Low Brass.

4c per lb. more than High Brass.
Gilding metal 8c per lb. more than High Brass.
Platers' or Gold Metal
In Bars.....48c
Sawed.....51c
Planed or Polished...54c

For Slitting.

Metal in width in. to ⅛ in. to No. 28, inclusive, 1c per lb advance.
Metal, in width 2 in. to 1 in., thinner than No. 28, 2c per lb. advance.
Metal, in width ⅛ in. to ¼ in. thinner than No. 28, 5c per lb. advance.
Metal ¼ in. in width and less, 10c per lb. advance.
Any of the above widths cut to particular lengths, add 7c per pound.

COAL,

WHOLESALE.

Wholesale f.o.b. vessel at Cleveland:

Carbon Hill and Monday Creek.....$2 65
Massillon.....2 75@ 2 85
Brier Hill.....3 25@3 75
Pittsburgh.....3 00
Salineville.....2 25
Tuscarawas.....2 25

RETAIL.—Delivered.

Massillon Lump.....$4 00
" Nut.....3 75
Carbon Hill and Monday Creek, lump.....3 75
Carbon Hill and Monday Creek, nut.....3 50
75c less on cars by car load.
Anthracite Stove and Chestnut.....7 15
Egg and grate.....6 00

GLASS.

(Per box of 50 feet)

SINGLE THICKNESS

6x8 to 10x15.....
11x14 to 15x24.....8 50
16x24 to 20x28.....9 75
15x34 to 24x30.....10 75
26x28 to 24x36.....11 50
26x36 to 26x44.....13
26x46 to 30x50.....14 00

DOUBLE THICKNESS

6x8 to 10x15.....11 7
11x14 to 15x24.....13 25
16x24 to 20x28.....15 75
15x34 to 24x30.....17 25
26x28 to 24x36.....18 50
26x36 to 26x44.....21 25
30x50.....22 50
30x52 to 3ox54.....23 25
30x56 to 34x56.....25 00
34x58 to 34x60.....27 75
36x60 to 40x60.....30 00
Dis 60 & 15 single, 60 & 20 double

OILS.

Pure Oils. packages included

Sperm, winter bleached per gal.....1 25
Whale, winter bleached per gal.....63
Straits.....50@53
"A" oil for tanner's use 35 @40
Lard oil extra W S....1 03@1 10
do No 1 do.....82@87
do No 2 do.....72@77
Tallow oil.....75
Neatsfoot oil pure....90@95
do No 1.....80@85
Linseed oil, raw.....54
do do boiled.....57
Cotton seed oil white..64 @ 66
do do yellow 60 @ 63
West Virginia lubricating 28 deg.....20c@30c
Pure Mecca.....55@ 50
Paraffine oil winter pressed.....25@ 30
Machinery.....40
Engine.....50
Miners' oil.....40@45
Drilling oil.....40

Hides and Leather.

Prime cured hides,.....8½@9
Green hides.....5@6
Bull, scrubby, badly scored or damaged, cured, two-thirds price.
Prime dry hides.....18@19
Horse hides, green....No.1,$2 00
Prime cured veal calf, 12@12½
Ohio Deacon S, salted. 60
Pelts, wool on.....25@30
Fresh slaughter sheep 30@$1 50
Fresh slaughter lambs 50@60
Green calf skins.....18
Hemlock rough.....23@24
Oak harness.....34@38
Oak sold.....37@34
Union harness.....31@ 0

Cleveland Business Directory.

Assayers and Analytical Chemists.

JUDSON, W, E, Analytical Chemist, 8 Cushing Block.

Bolt and Nut Works.

HOTCHKISS & GAYLORD, manuf'rs. Machine, Plow & Elevator Bolts, Coach Screws.

Boiler Makers.

SMITH & TEACHOUT—(Established 1857.) Boiler, Tanks, Stills etc. 439 Broadway.

Bridge Builders.

BUCKEYE BRIDGE AND BOILER WORKS mfrs of Arch & Truss Bridges, Boiler Tanks and Oil Stills. Bet. Wasson St. and Case Ave.

Coal and Iron Exchange.

JACKSON IRON CO. Iron Ore and Pig Iron. Rooms 8 and 9. Fayette Brown, Gen. Agent.

RHODES & CO. Coal, Iron Ore an Pig Iron. Rooms 1 and 2.

Carriage Blacksmith.

STRIEBEL, CHAS. manfac'r. of Carriages and Wagons and platform trucks. Horse shoeing and general blacksmithing .93 Woodland ave.

Carriage Bolts.

THE COLWELL & COLLINS NORWAY BOLT CO., manufacturers of Philadelphia Carriage and Tire Bolts.

Church and School Furnture.

FAULHABER, GEO. manufacturer of School and Church Furniture. Fine Hard Wood work a specialty. 203 Ontario Street.

Custom Boots and Shoes.

ROONEY, JOHN manufacturer of hand-made Boots & Shoes, custom made and warranted 177 Ontario Street.

Carriage Repository.

GREENE'S, J. O., Carriage Repository, 408 Superior street and 52, 54 & 56 Rockwell street, dealer in Fine Carriages. Repair shop in connection.

Coal and Pig Iron.

ANDREWS, HITCHCOCK & CO., Briar Hill Coal and Pig Iron. 122 Water Street.

Electrical,

ELECTRIC SUPPLY CO. manfrs and dealers in Electric Burglar Alarms, Annunciators, Cell Bells and Batteries. Telephone lines built and repaired. 145 Seneca Street.

Fresco Artists.

KEMMER & KUSHMAN DECORATIVE CO., Fresco Artists, Fine Modern Wall Papers. 338 Euclid ave.

Foundries.

BOWLER & CO., Car Wheels, Patent Chilled Frogs, and all kinds of castings. 9 Winter.

CLEVELAND MALLEABLE IRON CO., manufacturers Malleable Iron Castins.

LAKE SHORE FOUNDRY, Water and Gas Pipe, Light and Heavy Castings. Alabama st.

TAYLOR & BOGGIS, successors to H. & H. F. Taylor, Iron Founders, 65 to 73 Central Way.

FITZSIMONS WM. & SON, Rolling Mill and Machinery castings. Rolls a Specialty. No. 435 Broadway.

File and Saw Works.

PARKIN, W. H. & CO., Hand-cut Files and Rasps, dealers in Disston's saws, 11 So. Water

Flue Cleaner.

CLEVELAND FLUE CLEANER M'F'G. CO. manufacturer of Aitchison & Doolittle's Patent Steam Flue Cleaner, 22 & 24 Power Block.

Hotels.

FOREST CITY HOUSE, cor. Public Square and Superior st., Terrill & Ingersoll, Props.

KENNARD HOUSE, D. McClasky, Prop.

NEW ENGLAND HOTEL, Water st., W. W. Wolcott, Prop. Refitted and refurnished.

STRIEBINGER HOUSE, between Ontario and Seneca sts. $2.00 per day. Hawley & Langton

CITY HOTEL, Seneca street. H. B. West, proprietor. $1.50 per day.

Hides, Pelts and Leather.

DENNISON BROS., dealers in Hides, Pelts, Furs and Tallow, 48 and 50 River street.

Hardwood Lumber.

MARTIN, J. T. dealer in Hardwood Lumber, Stone's Levee, near Central Way.

Lumber.

WOODS, PERRY & CO., manufacturers and dealers in Lumber, Lath, etc., 5 Carter st.

FISHER, WILSON & CO., wholesale lumber dealers (pine & hard wood), rough and dressed umber, timber, lath, shingles, etc. 47 Central Way

KRAUSE, C. A., & SON, wholesale and retail dealers in lumber. Yards cor. Superior and Wason and 281 Merwin streets.

Oil Manufacturers.

AMERICAN LUBRICATING OIL CO., manufacturers of lubricating oils, 23 Euclid ave.

Cleveland Business Directory.

Hardware and Iron.

BINGHAM, WM. & CO., Hardware, Iron, Nails and Metals, 148 and 150 Water street.

CLEVELAND ROLLING MILL CO., manuf'rs. of Steel and Iron Wire and Steel Tire.

WORTHINGTON, GEO. & CO., Hardware and Dealers in Metals, Water street.

Lime Manufacturers.

RUSSELL LIME CO., manufacturers of White Lime; also dealers in Plaster, Cement, etc. 85 Elm street.

Machinery and Boilers.

CLEVELAND STEAM FURNACE CO., Engines and Boilers, cor. Detroit and Center sts.

KRITCH, K. E. Metal Pattern Maker. Small machinery repaired. Lawn Mower sharpening a specialty. 42 South Water Street.

Machinery Depot.

CLEVELAND MACHINERY DEPOT, (now National Machinery Depot.) The largest stock of New and Second-hand Engines, Boilers and Machinists' Tools. Shop and Warehouse corner Bond and Superior streets.

Mercantile Agency.

THE MERCANTILE AGENCY. R. G. Dun & Co. proprietors. 121 Superior street.

Pattern and Model Makers.

WHITTINGHAM, J. & C., Metal Pattern and Model makers 52 Canal Street.

REID, J. C., Pattern and Model Maker. 52 Canal Street., (Up Stairs.)

COTTRELL & CO., W. L., Pattern Makers, 53 Center street.

STAIR BUILDER.

PFEIL, CHAS, Stair Builder; Hard Wood Mantles and Office Railing. Works, 49 & 51 Canal street, Cleveland, Ohio.

Steel Stamps and Stencils.

FLEHARTY, J. H. & CO., Rubber Stamps, Seals, Stencils. 197 Superior street.

Steam Furnaces.

CUYAHOGA STEAM FURNACE CO., Manfrs of Land and Marine Engines. Machinery for Blast Furnaces, Rolling Mills, Bessemer Steel Works, &c. Mill-Gearing and all kinds of Castings, Foundry, Machine and Boiler Shops.

Trunks and Valices.

FABER, J. manuf. Trunk, Traveling Bags and Ladies' Fine Satchels. Sample Trunks and Cases a Specialty. 56 Public Square.

Vessel Agents.

WEBB, H. J. & CO., Ship Brokers and Vessel agents. 17 & 18 Board of Trade Building. 122 Water Street.

Wood Carving.

HERKOMMER, J., Carver and Ornamenter in Composition. 225 Erie street.

Business Directory.

Akron, O.

AKRON IRON CO., manufacture best Common, Refined and Charcoal Iron.

CASCADE HOUSE, cor. Mill and Summit sts., near Depot. J. Downie, Prop.

MCNEIL, J. C., Steam Boilers, Heavy Sheet Iron Work. Repairing promptly executed.

PERKINS, C. E., dealer in Agricultural Implements, machinery, and Manufacturers' Ag'nt

TAPLIN, RICE & CO., manuf'rs. of Stoves and Hollow Ware, dealers in Tinners' Stock, etc.

WEBSTER, CAMP & LANE MACHINE CO., Founders and Machinists, 12 Main street.

AKRON POLISHING & PLATING WORKS. Man'f'rs of solid leather wheels for polishers.

Alliance, O.

MCFARLAND, J. W. Engine and Machine Builder, and General Machine Jobbing.

Buffalo, N. Y.

SANDS, PAUL, Marine and Stationary Steam Engine Works mfr. of drilling machines, foot and power lathes. 70 Columbia street.

EMPIRE STATE MF'G CO., O. F. Swift, prop'r, manfr of Fluters, Sad Irons, Spun Copper & Half Copper Tea Kettles. Washington, cor. Ohio

WHITE, L. & I, J. manf'r's of Coopers' Tools, Carpenters' Tools, and Ship Tools Also manf'r's of Planer Knives and Machine Cutters to order 310, 312, 314 Exchange street.

THE BUFFALO NUT AND BOLT CO. [Limited.] Manufrs. of Hot Pressed Nuts, Bolts, Washers, Rivets, &c. No. 226 Ohio Street.

Cuyahoga Falls, O.

THOMAS BROTHERS, manfrs of Ohio Stone Ware. Cuyahoga Falls Stone Ware Factory, cor. Main and Broad streets,

TURNER, VAUGHN & TAYLOR, manufacture engines, presses and grinding machinery for clay; also paper, chain, wire and flour mill machinery. Send for Circulars and price list.

SNYDER, H. wholesale manu acturer of Sash, Doors, Blinds, &c. Send for Price Lists.

THE CUYAHOGA FORGE AND IRON CO., manfrs. of every description Car, Truck and Driving Axles, Forging, Shafting. &c.

Wheeling, W. Va.

EXCELSIOR MACHINE WORKS, Redman & Co., general machinists and manufacturers of Marine and Stationary Engines, Hangers, Pulleys, Shafting, &c. Cor. 18th & Chapline streets.

Business Directory.

Canal Dover, O.

HECKMAN, E., manufr. and dealer in harness leather, upper, kipp and calf. Also, manufacturer & dealer in prime English Dairy cheese. Highest market cash price paid for hides.

Columbus, O.

PAT. ADJUSTABLE WINDOW CURTAIN Cornice, manufactured by Strader's Curtain Cornice Works.

ROYCE & PULLING manufrs of Patent Steam Pumps for all purposes. Store room 30 High street. Works Nos. 5 and 7 Scioto street.

U. S. CARRIAGE CO. builders of fine Carriages, Buggies and Phætons. Salesrooms and Office 257, 259 and 261 Fourth street.

REYNOLDS BROS., manufacturers of hand-cut Files and Rasps. Old files re-cut. Send for Price List.

CITY BOILER WORKS, manfrs of Stationary, Portable and Locomotive Steam Boilers. All work warranted. Borger Bros. & Co.

MURRAY, HAYDEN & CO., manfrs of Malleable Iron. Cor. Randolph & West streets.

Canton, O.

DIEBOLD SAFE & LOCK CO., manuf'rs. Safes, Locks, Bank and Safe Deposit Works.

NOVELTY IRON WORKS, Mill work, Shafting, engines, Imperial job printing press, etc

NEW AMERICAN HOUSE, Canton. Fred. Hipp, Prop.

Erie, Pa.

GUNNISON, A. B., wholesale manufacturer of Wood Pumps. 233 East Twenty-Second St.

BALL ENGINE CO., limited, manufacturers of Automatic Engines of 15 to 80 horse power

NOBLE SEWING MACHINE CO. manfrs of the New Noble Sewing Machine. Send for circulars and prices.

A. B. FELGEMAKER & CO. Church Organ builders. Descriptive catalogue furnished on application.

Geneva, O.

THE ENTERPRISE MACHINE CO., L. L. Crane, Pres't, manfrs of Machinists' Tools and Machinery. Gear Cutting a specialty.

Lima, O.

LIMA HOUSE, centrally located; telegraph office in the house. J. Goldsmith, Prop.

Meadville, Pa.

CURRY & CO. general jobbers in Castings of al kinds.

Olean, N. Y.

MYRICK BROS. & CO., manufact'rs Engines and Boilers, oil drilling tools, rig irons, etc.

Oil City, Pa.

REID, JOS. Machinist, steam engine and pump repairing. Brass and sron castings, light and heavy, made on short notice.

Pittsburgh, Pa.

PRINTING PRESSES. W. A. Bunting, manufacturers' agent. Printers supplies, type, cards. 42½ Sixth Street. [Up stairs.]

BAIR & GAZZAM, practical machinists; gear cutting a specialty. Rice's Feed Water and Heater. 17 Wood street, corner First Avenue.

Painesville, O.

NORTH AMERICAN CUTLERY CO., m'fr's of Steel Shears and Scissors—best quality.

Ravenna, O.

THOMPSON, T. F., dealer in Agricultural Implements, farm machinery, hardware, seeds, fertilizers, &c. Cor. Main and Prospect sts.

BALDWIN, D. L. & SON, Contractors & Builders and manfrs of all kinds of Moulding, flooring, siding, &c. Rip, Band and Scroll Sawing.

Rheims, N. Y.

GREAT WESTERN CHAMPAGNE. Finest made in America. Equal to best imported. Has taken highest awards everywhere, and is used all over the Continent. Try a case, and you will have no other. Pleasant Valley Wine Co., Rheims, N. Y.

Rochester, N, Y.

GOWE, JNO. N., mfrs. of Specialties, such as Machine forging, bridge bolts and trusses, railroad switches, spike, mall, chisels, &c.

ELEVATORS for Hotels, Factories and Private Houses. J. S. GRAHAM & CO.

WOOD-WORKING MACHINERY. Send for Catalogue. J. S. GRAHAM & CO.

RAZOR STROPS. Sole mfrs. of all kinds of Razor Strops. Uischt, Linn & Co. 131 N. Water

Steubenville, O.

DORRANCE, D. W., Tool Works, manufacturer of hand-made miners' and stone-cutters' Tools. Promp attention given to mail orders.

Sandusky, O.

SANDUSKY WHEEL CO. manfrs. of Sarven Patent Wheels, Carriage Bodies and Seats, Plain Wood Hub Wheels, Banded Hub Wheels, Jacob's Patent Neck Yokes.

Sandy Lake, Pa.

EBERMANN, W. S. & SONS, manfrs. of the celebrated Ebermann Boiler Feeder. Send for Circulars and Price List.

Business Directory.

Titusville, Pa.

FOSTER & MCKAY, dealers in boilers and engines, tubing, casing, old iron, rope, and all kinds of metals. Washington street, nr. Railroad.

Toledo, O.

BAKER, HERBERT, Machine Shop and Iron Foundry. 98 and 100 Erie street.

TOLEDO FOUNDRY AND MACHINE CO. builders of Steam Engines, Circular Saw Mills and all kinds machinery. Water St., cor. Cherry

RUSSELL IRON WORKS, mnfrs. of Arch. tectural Iron Work, castings, pulleys, shafting and steam bending machinery. Cor. Water and Lagrange streets.

STANDARD SAW WORKS, H. Bartley, manufacturer and dealer in Saws of every description. All kinds of Springs made from Sheet Steel. Reaper, Hay Knives Truss Springs, &c. made to order. 92 St. Clair Street.

UNION Wooden Ware Manufacturing Co. manufacture Sewing machines, washboards, children's wagons, carts, wheelbarrows, sleds, kitchen wooden ware, &c.

HEPBURN BROTHERS, proprie. Union Boat Works. Boats of all kinds made to order. For sale or rent. Water Street foot of Cherry.

Union City, Ind.

LAMBERT, J. W. & CO., mfrs of fork, rake, hoe and broom handles; spokes, hubs, whiffletrees, yokes, plow-rounds, &c. Correspondence solicited.

Youngstown, O.

BELL, EDWIN & SON, manuf. of Nail Kegs, Pat. coiled hoops, slack barrel and keg heading and oil barrel stock.

DINGLEDY, G. H. dealer in rough and dressed Lumber, Shingles and Lath.

MORTON HOUSE, formerly Maitland House, James Morton, Prop.

TOD HOUSE, cor. Diamond and Market streets. Henkel & Bowman, Props.

Zanesville, O.

KIRK HOUSE, William Kirk, proprietor. $1.50 per day.

Brattleboro', Vt,

A JOY FOREVER!

ESTEY ORGANS

Manufactured by

J. ESTEY & CO.,

Brattleboro', Vt.

(Catalogue free on application.)

CLEVELAND NON-CONDUCTING CO.

MANUFACTURERS & DEALERS IN ASBESTOS, HAIR FELT, CEMENT, & OTHER

Pipe Coverings,

19 SOUTH WATER STREET, LAND, OHIO.

HEALTH A physician's gift to the debilitated—"Treatise on Cause and Cure of Nervous Debility" sent on receipt of two 3-cent stamps. Address Dr. CLEGG, CLEVELAND, O

Smith & Curtiss,

JOBBERS OF

TEAS,

COFFEES AND SPICES

ALSO PROPRIETORS OF THE CLEVELAND

Coffee and Spice Mills,

107 & 109 Bank Street,

Cleveland, O.

TRAVELERS' RECISTER.

Lake Shore & Michigan Southern.

TRAINS GOING EAST.	Arrive. From West.	Depart. From East.
Fast N. Y. Express	*1 35 a m	*1 50 a m
N.Y.,Boston & AtlanticEx.	*7 05 a m	*7 30 a m
Elyria Accommodation	†8 35 a m	.....
Pt.Clinton Accommodation	†11 00 a m	.....
Buffalo Accommodation	†11 00 a m	†11 15 a m
N. Y and Boston Fast Ex.	*2 25 p m	*2 55 p m
Conneaut Accommodation	.....	†4 50 p m
Night Express	†10 10 p m	†10 35 p m

TRAINS GOING WEST.	Arrive. From East	Depart. From west.
Fast Limited Express	*12 23 a m	*12 33 a m
Mich. Ex. via Sandusky	*2 50 a m	*3 05 a m
Chicago Ex. via Sandusky	†6 35 a m	7 00 a m
Mich. Accom. via Norwalk	.....	†6 40 a m
Conneaut Accommodation	†8 40 a m	.....
Toledo Ex. via Norwalk	†1 25 p m	†3 30 p m
St. Louis Ex. via Sandusky	*1 40 p m	*2 05 p m
Chi. Pac. Ex. via Norwalk	*7 05 p m	*7 35 p m
Pt.Clinton Accommodation	.....	†5 00 p m

Sunday trains for Nottingham—Depart 0:00 a m m. and 2:15 p. m., return at 10:05 a. m. and 4:45 p. m.

Reference marks—*Daily. †Daily except Sunday. ‡Daily except Monday.

Cleveland, Columbus, Cincinnati & Indianapolis.

ARRIVALS.	
No. 2 Col. & Cin. & Ind'polis Ex.	*7 10 A.M
No. 8 C. T.V. & W. & Clev Accom.	10 30
No. 12 St. Louis & New York Exp.	*3 00 P.M
No 6 Indianapolis & Columbus Exp.	10 20
No 4 Columbus & Cincinnati Exp.	*3 40
No. 10 Wheeling Express	7 15

DEPARTURES.	
No. 1 Cincinnati & Columbus Exp.	*8 00 A.M
No. 11 Cleve, Indianap. & Wheel'g Ex.	7 10
No. 3 Special St. Louis & Cincinnati Ex**	1 55 P.M
No. 5 Night Express,	*7 25
No. 7 C.T.V. & W. & Col. Accom	4 00

**This train runs daily to Indianapolis and St. Louis, and daily, except Sunday, to Cincinnati.

Cleveland, Tuscarawas Valley & Wheeling.

ARRIVALS.	
Wheeling & Cleveland Express	8 25 P.M
Uhrichsville Express	10 30 A.M

DEPARTURES.	
Wheeling & Cleveland Express	7 15 A.M
Uhrichsville Express	4 00 P.M

New York, Pennsylvania & Ohio.

ARRIVALS.	a.m.	a.m.	p.m.	p.m.
Through from East	6 50	.....	.....	*7 00
N.Y. P. & O. (Mahoning)	10 55	.....	2 00	*7 00
Pittsburgh Express	.....	.....	2 00	*7 00
Pittsb'g& Youngs'tn Ac.	10 55	.....	.....	10 15
DEPARTURES.	**a.m.**	**a.m.**	**p.m.**	**p.m.**
Through Eastern Train	*7 10	.....	.....	10 45
N. Y. P. & O.(Mahoning)	.....	.....	.....	4 25
Youngs'tn & Pitts'bg Ac.	.....	11 00	.....	.....
Pittsburgh Express	.....	*7 10	*2 30	.....

Cleveland & Pittsburgh.

	ARRIVE.	DEPART
Pittsburg & Wheeling	1 45 P.M	8 50 A.M
Express	6 55	2 30 P.M
Alliance Accommodation	10 15 A.M	3 45
Ravenna Accommodation	8 35	5 35
Night Express	6 30 A.M	†11 40 P.M

† Night Express runs daily, except Saturday, by way of Wellsville, and on Saturday by way of Alliance.

Valley Railway.

ARRIVE.		DEPARTUPES.	
No. 2 Accom.	10 15 A.M	No. 1 Mail	8 15 A.M
No. 6 Express	1 35 P.M	No. 3 Accom.	2 30 P.M
No. 4 Mail	6 30 P.M	No. 5 Exp.	6 05

Special trains leave on Sunday at 8.25 A. M. and 4.20 P. M., arriving at Cleveland at 10 A. M. and 6.25 P. M.

Trains leave from Depot foot of South Water Street.

Connotton Valley Railway.

Arrive.		Depart.	
No. 1	10 05 A.M	No. 4	9 15 A.M
No. 3	6 40 P.M	No. 2	4 05 P.M

All trains arrive and leave depot corner Commercial and Fifth Streets

Cleveland, Akron & Columbus Railroad,

Cleveland, Akron & Columbus Railroad, running over Cleveland & Pittsburgh Railroad to Hudson, for Akron, Columbus, etc.

	ARRIVE.	DEPART.
Mail	1 15 P.M	8 00 A.M
Express	7 25	1 50 P.M
Accommodation	10 10 A.M	3 45 P.M

CLEVELAND & PITTSBURGH

RAILROAD.

Trains leave Cleveland and arrive at the points named below as follows: Night Express runs daily, all other trains dail except Sundays.

	Mail.	Fast Line.	Accom.	Night Expr'ss.
Leave Cleveland	8 50 am	2 30 pm	3 45 pm	11 40 pm
Arrive Hudson	10 00	3 28	4 50	12 50 am
Ravenna	10 40	3 58	5 50	1 18
Alliance	11 25	4 25	6 05 pm	2 05
N. Philadel	11 35 pm	7 15	.....	10 55
Salem	12 25	.....	.....	3 02
Canton	12 28	5 47	.....	3 20
Massillon via Alliance	12 50	6 06	.....	3 38
Akron	10 42 am	4 10	5 40 pm	.....
Pittsburgh	3 30 pm	7 45	.....	6 55
Wheeling	5 10	8 00	.....	8 55
Marietta	8 45	.....	.....	.....
Harrisburg	.....	4 15 am	.....	4 00 pm
Philadelphia	.....	7 50	.....	7 35
New York	.....	11 15	.....	10 35
Baltimore	.....	7 55	.....	7 20
Washington	.....	9 17	.....	8 47
Boston	.....	8 00 pm	.....	.....

Ravenna Accommodation leaves Cleveland at 5:30 p m, reaching Ravenna at 7:15 p m; Akron 2;3 p m.

Newburgh Accommodations leave Cleveland at 11:00 a m and 12:30 pm. Returning, leave Newburgh at 11:10 am and 1:30 pm.

Passengers for New York, Philadelphia, Baltimore, Washington, and all points east of Pittsburgh make but one change of cars, viz. at Union Depot, Pittsburgh, excepting those leaving on the Fast Line which has Pullman Sleepers from Cleveland to Philadelphia and New York.

The Fast Line leaving at 2;30 P. M. has elegant Pullman Palace Sleeping Cars through from Cleveland to New York without change. Pittsburgh Passengers who desire Parlor Car accommodations can secure seats in this car.

The Night Express has Pullman Sleeping Cars from Cleveland to Pittsburgh which can be occupied by passengers at Union Depot, Cleveland, any time after 9:00 P. M. At Pittsburgh passengers can take elegant through Parlor or Sleeping Cars for the East.

Sleeping and Parlor Car accommodations from Cleveland and Pittsburgh eastward can be secured at the Union Sleeping and Parlor Car Office Union Passenger Depot; of H. C. Marshall, Union Ticket Office, Weddell House; or of the Ticket Agent at the Euclid Avenue Station.

Through tickets can also be secured at the same points. Baggage checked through from the Union Depot or from Euclid Avenue Station.

By the 8:50 A. M. train a through car leaves daily for Akron, Gambier, Mt. Vernon, Columbus and immediate points, without change.

The 2:30 P. M. train has through car for Akron, Orrville, Columbus and immediate points, arriving in Columbus at 9:25 P. M.

By the 3:45 P. M. Accommodation train cars run through without change from Cleveland to Cuyahoga Falls, Akron and Millersburgh,

Night Express leaving Cleveland at 11:40 P. M., runs daily, and makes connection at Wellsville for Steubenville, Bridgeport, Wheeling, Bellaire and intermediate points. Every night in the week except Saturday the night express runs via Wellsville. On Saturday nights it runs via Alliance. All other trains run daily except Sunday.

Trains arrive at Cleveland.—Night Express at 6:30 P. M., having Pullman Sleeper from Pittsburgh; Ravenna Accommodation, 8:35 A. M., Alliance Accommodation, 10:15 A. M.; New York Wheeling & Washington Mail, with Pullman Sleeping Car from New York and Philadelphia, 1:45 P. M.; New York, Philadelphia & Wheeling Express, 6:55 P. M.

WM. A. BALDWIN, General Manager. **E. A. FORD,** Gen'l Pass. & Tkt. Agt. Pittsburgh, Pa.

C. L. KIMBALL, District Passenger Agent, corner Bank and St. Clair streets, Cleveland.

Cleveland to New York,

VIA THE

NEW YORK, PENNSYLVANIA AND OHIO RAILROAD.

Formerly Atlantic & Great Western Railroad.]

For New York, Boston and the East. The shortest and quickest route to Pittsburgh, Washington, Baltimore and the Southeast

Until further notice trains will leave the new Central Depot, South Water Street and Viaduct, as follows:

7:10A.M. LIGHTNING EXPRESS, (daily,) sleeping and hotel coaches from Leavittsburg 8:55 a.m. To New York, Albany and Boston without change. Parlor car, Cleveland to Salamanca. Arrives at Meadville 11:20 a.m., (dinner); Franklin, 12:33 p.m.; Oil City, 1:00 p.m.; Corry, 1:00 p.m.; Jamestown, (Lake Chatauqua) 1:57 p.m.; Buffalo, 6:15 p.m.; Rochester, 8:30 p.m.; Hornellsville, 6:40 p.m., (supper); Corning, 8:25 p.m.; Elmira, 8:57 p.m.; Binghampton, 10:58 p.m.; Albany, 6:00 a.m.; Boston, 2:45 p.m.; arriving at New York, 6:50 a.m.

10:45 P.M. NIGHT EXPRESS, (daily except Sunday), Sleeping Coach from Leavittsburg to New York without change, Arrives at Youngstown 1:45 a.m; Meadville, 3:50 a.m.; Corry, 5:20 a.m.; Jamestown, 6:22 a.m.; Buffalo, 9:45 a.m.; Rochester, 1:10 p.m.; Hornellsville, 11:20 a.m.; Corning, 12:53 p.m.; Elmira, 1:21 p.m.; Binghampton, 2:50 p.m.; New York, 9:25 p.m.

2:30 P.M. PITTSBURGH EXPRESS,—daily, through without change. Parlor Car, Cleveland to Pittsburgh, arrives at Youngstown, 5:00 p.m.; Pittsburgh, 7:48 p.m; Washington, 7:30 a.m.; Baltimore, 8:19 a.m; via Sharon and Meadville, 7:00 p. m.

4:25 P.M. MAHONING ACCOMMODATION, stopping at all way stations. Arrives at Youngstown, 7:25 p.m; Sharon, 8:30 p.m; Sharpsville 8:40 p.m; connects at Leavittsburg with train No. 20 for Meadville and intermediate points, arrives at Meadville, 11:05 p.m. Pittsburgh, 10:48 p. m.

7:10 A.M. PITTSBURGH EXPRESS,—(daily) through without change. Arrives at Youngstown, 9:50 a.m.; Sharon, 10:55 a.m.; Sharpsville, 11:05 a m.; Pittsburgh, 12:45 p.m. Returning, leave Pittsburgh, 4:48 a.m., 8:33 a m., and 1:13 p.m. and 4:20 p.m.

11:00 A.M. YOUNGSTOWN & PITTSBURGH Accommodation, stopping at all Way Stations, arriving at Youngstown 1:50 p m.; Pittsburgh, 6:10 p.m. Trains arrive at Cleveland, 6:50 a.m., 7:00 p.m., 10:55 a. m. 2:00 p.m., and 10:15 p.m.

☞ This is the only route by which passengers can reach Corry, Elmira, Binghampton, New York City, and intermediate points WITHOUT CHANGE. No change to Boston and New England cities.

Baggage Checked Through to All Points East

☞ Through Tickets and information regarding the route can be obtained at the Union Ticket Office, corner Bank and Superior streets; at office 131 Bank street, and at new Depot of New York, Pennsylvania and Ohio Railway, South Water street and Viaduct, Cleveland.

A. E. CLARK,
Gen. Pass'r. Agt., Cleveland, Ohio.
M. L. FOUTS,
J. M. FERRIS, Gen. Man'gr. Cleveland — Pass. Agt., 131 Bank st., Cleveland.

NOTICE.—Hereafter all Passes must be returned to the General Passenger Agent within FIVE DAYS after date of expiration; otherwise they will be discontinued.

Blue Grass Route of Ohio

TIME TABLE.

The Cleveland, Mt. Vernon and Delaware RAILROAD.

GEO. D. WALKER, RECEIVER.

SOUTH-BOUND TRAINS

STATIONS.	Accom	Accom	Expr	Mail	Sundays only
Leave.	P. M.	P. M.	P. M.	A.M.	P.M.
Cleveland	5.30	3.45	2.30	8.50	.....
Hudson	6 58	5.02	3 35	10.10	4 20
Cuyahoga Falls	7 11	5.30	3.58	10.29	4 40
Akron	7 23	5.46	4.10	10.42	5 00
*North Portage	P.M.	6.00	4 24	10.54*	6 14
Clinton	.....	6 19	4.44	11.09	5 31
Warwick	.....	6 29	4.49	11.14	5 37
*Marshallville	.....	6 43	5.02	11.27*	5 50
Orrville	.....	6 58	5.14	11.42	6 02
*Apple Creek	.....	7.17	5 32	11 58*	6 22
Fredricksburg	.....	7.32	5.45	12.11	6 37
*Holmesville	.....	7.43	5 55	12.21*	6 48
Millersburg	Accom	7 55	6.08	12.34	7 00
	A. M.	P.M.			A.M.
Millersburg	5.50	.....	6.08	12 34	7 00
*Killbuck	6.02	.....	6.20	12.47*	7 12
*Black Creek	6.13	.....	6.31	12.59*	7 25
Gann	6.33 b 6.53	.....	6.51 s 7.11	1.19	7 47
Danville	7 04	.....	7.20	1.29	7 59
Howard	7.13	.....	7.29	1.38	8 10
Gambier	7.22	.....	7.38	1.47	8 20
Mt. Vernon	7.35	.....	7.51	2.00	8 33
*Bangs	7.45	.....	8 01	2.10*	8 45
*Mt. Liberty	7.53	.....	8.09	2.20*	8 54
Centerburg	8.05	.....	8.18	2.30	9 05
*Condit	8.19	.....	8.32	2.44*	9 19
*Sunbury	8.27	.....	8.40	2.53*	9 28
*Galena	8.32	.....	8.45	2.58*	9 34
Westerville	8.48	.....	9.00	3 15	9 50
Arrive at Columbus	9.15	....	9.25	3.40	10 20
	A.M		P M.	P.M.	A.M

NORTH-BOUND TRAINS.

STATIONS.	Expr	Mail	Accom	Accom	Sundays only
Arrive at	P M	P M.	A. M.	A. M.	A.M.
Cleveland	1 45	6 55	10.15	8.30	.....
Hudson	12.35	5.48	8.53	7.15	10.30
Cuyahoga Falls	12 16	5 30	8.33	6.58	10.11
Akron	12.03	5.17	8.20	6.45	9.50
*North Portage	11.46	5.00*	8.03	A. M.	9.34
Clinton	11.30	4.44	7.46	.....	9.18
Warwick	11.25	4 37	7.37	.....	9.12
*Marshallville	11.10	4.27*	7.23	.....	9.00
Orrville	10.57	4.14	7.10 b 6.40	.....	8.47
*Apple Creek	10.40	3.56*	6.22	.....	8.27
Fredricksburg	10.26	3.43	6.08	.....	8 13
*Holmesville	10 16	3.33*	5.58	Accom	8.02
Millersburg	10.05	3.22	5.45	7.50	
			A. M.	P. M.	P.M.
Millersburg	10 05	3.22	.....	8 35	7 25
*Killbuck	9 51	3.08*	.....	8.23	7.13
*Black Creek	9 39	2.57*	.....	8.11	7.00
Gann	9.17	2.36	.....	7.49	6 38
Danville	9.07	2.27	.....	7.39	6.25
Howard	8.58	2 18	.....	7.29	6.14
Gambier	8.49	2 09	.....	7.14	6 03
Mt. Vernon	8.37	1.57	.....	7.02	5.51
*Bangs	8.22	1.40*	.....	6.46*	5.37
*Mt. Liberty	8.14	1.31*	.....	6.37	5.28
Centerburg	8.05	1 22	.....	6.28	5.17
*Condit	7.51	1.09*	.....	6.14	5.03
*Sunbury	7.42	1.01*	.....	6.06	4.53
*Galena	7.37	12 56*	.....	6.00	4 47
Westerville	7.20	12 40	.....	5.43	4 30
Leave Columbus	6 55	12.15	.....	5.15	4.00
	A M	P M		P. M.	P.M.

* Stop on signal. B Breakfast. S Supper.

Special Round trip rates will be made for Sunday trains.

The Blue Grass Route of Ohio (Mt. Vernon line) will abandon their regular Sunday trains after September 10th, 1882.

N. MONSARRAT, Gen'l Supt. Akron, O
E. T. AFFLECK, General Passenger Ag't, Columbus, O.

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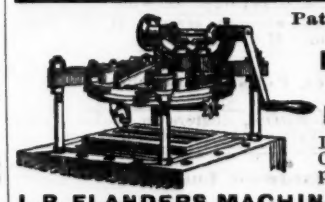
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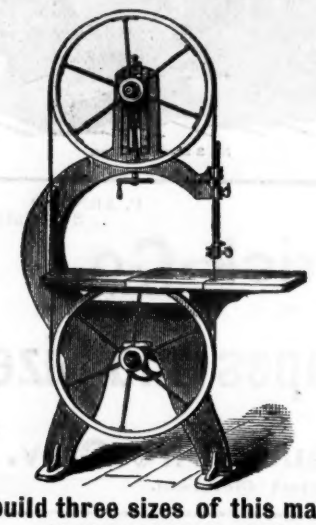

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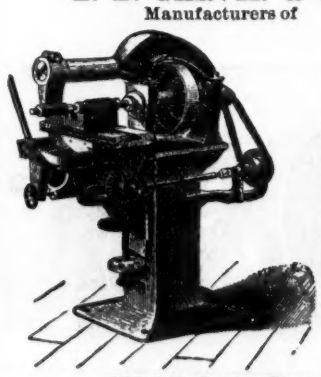

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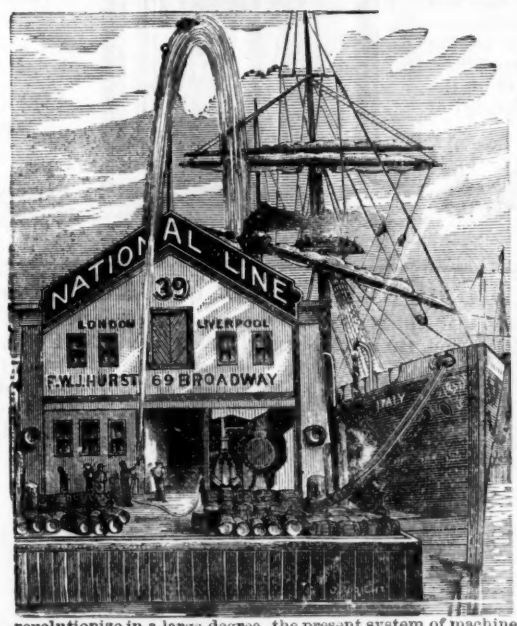

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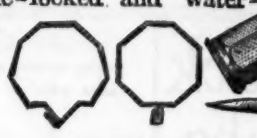

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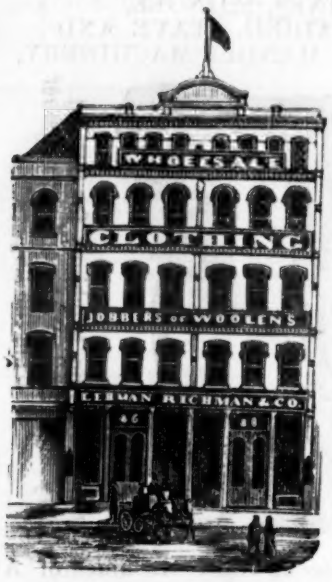

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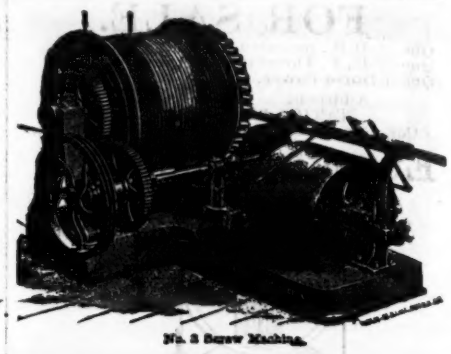
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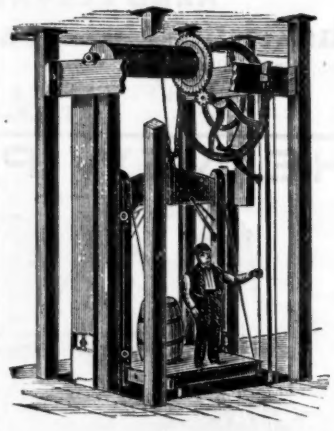

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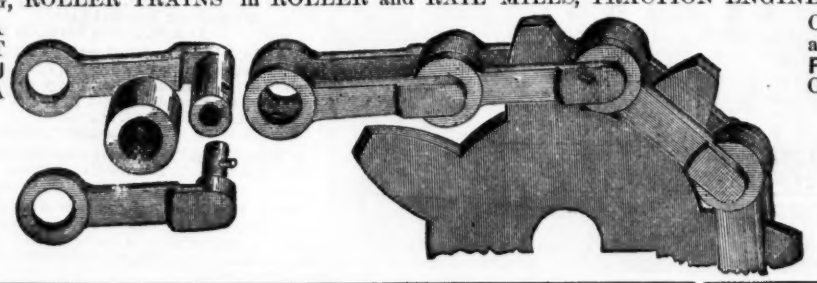

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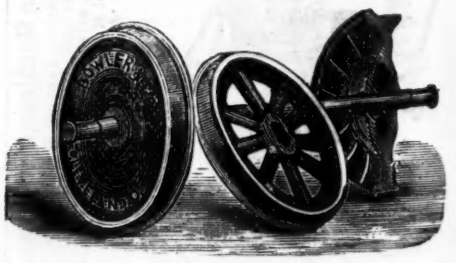

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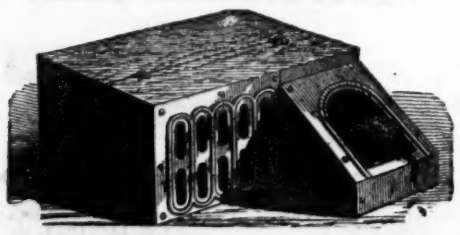
52,932 Mouse Traps Sold in October, 1881.



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"The mouse goes in to get the bait
And shuts the door by his own weight,
And then he jumps right through a hole
And thinks he's out; but bless his soul
He's in a cage, some how or other,
And sets the trap to catch another."

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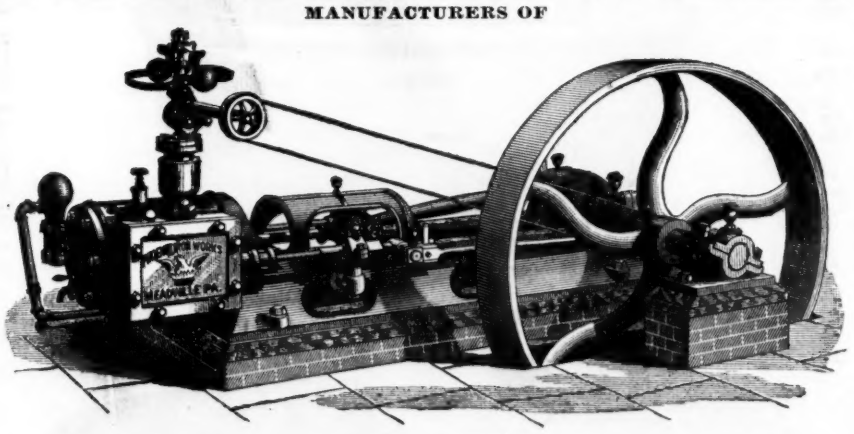

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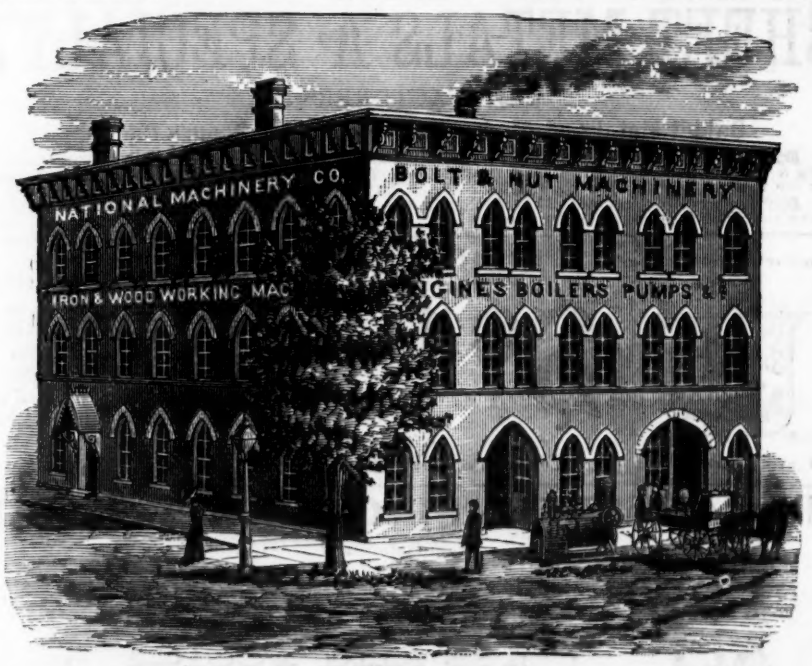

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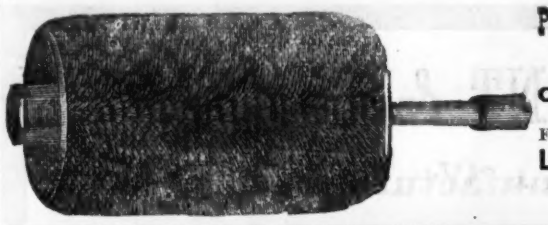

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